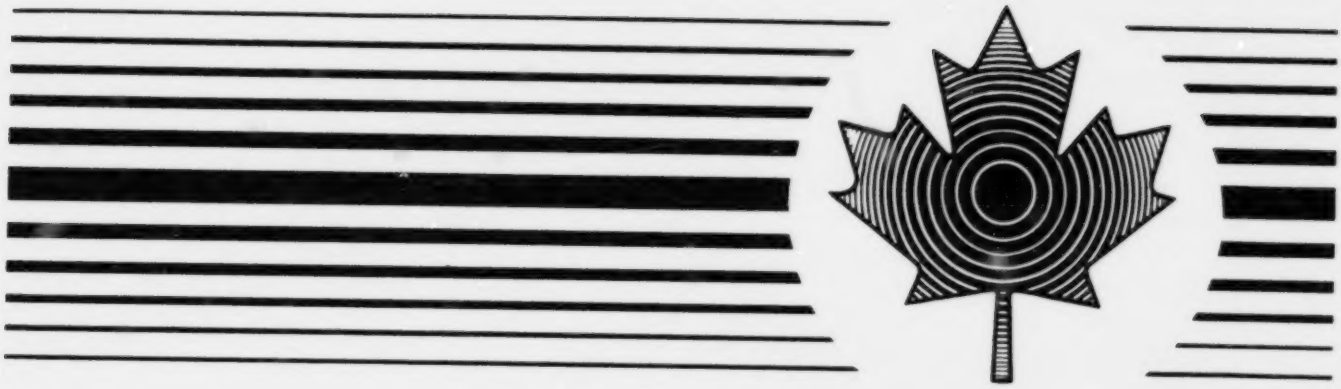

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THE IMPACT OF LOWER OIL AND GAS PRICES ON THE OIL AND GAS INDUSTRY IN ALBERTA

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CONTENTS

LIST OF FIGURES v

LIST OF TABLES vii

LIST OF ABBREVIATIONS ix

EXECUTIVE SUMMARY xi

CHAPTER 1 Introduction 1

1.1 Background to the Study 1
1.2 Study Objectives 2
1.3 Study Overview 2

CHAPTER 2 Study Scope and Methodology 3

2.1 Scope 3
2.2 Methodology 3

CHAPTER 3 The Oil and Gas Operators 11

3.1 Price and Market Expectations 11
3.2 Capital Expenditures 17

3.2.1 Regional Distribution of Capital Expenditures 19
3.2.2 Distribution of Capital Expenditures by Type 21

3.3 Summary 24

CHAPTER 4 The Impact on Service and Supply Contractors 27

4.1 Telephone Interview Results 28

4.1.1 Types of Service 28
4.1.2 Total Revenue 28
4.1.3 Export Revenue 31
4.1.4 Price and Market Expectations 33

4.2 Personal Interview Results 33

4.2.1 Current Market Situation 35
4.2.2 Reaction to the Current Market Situation 38
4.2.3 Other Comments 39

4.3 Summary and Conclusions 39

CHAPTER 5 The Impact on Oil and Gas Field Equipment Manufacturers 45

5.1 Telephone Interview Results 45

5.1.1 Type of Equipment 45
5.1.2 Total Revenue 47
5.1.3 Export Revenue 51
5.1.4 Price and Market Expectations 52

5.2 Personal Interview Results 53

5.2.1 Current Market Situation 53
5.2.2 Reaction to the Current Market Situation 56
5.2.3 Other Comments 56

5.3 Summary and Conclusions 57

CHAPTER 6 Impact on Industry Employment 61

6.1 Operators 62

6.1.1 Employment Level Changes 62
6.1.2 Employment Policy Changes 66
6.1.3 Employment Outlook 70

6.2 Service and Supply Contractors 72

6.2.1 Employment Level Changes 72
6.2.2 Employment Policy Changes 72
6.2.3 Employment Outlook 75

6.3 Manufacturers 75

6.3.1 Employment Level Changes 75
6.3.2 Employment Policy Changes 75
6.3.3 Employment Outlook 78

6.4 Summary 78

CHAPTER 7 Summary and Conclusions 85

7.1 Summary 86

7.1.1 Operators 86
7.1.2 Service and Supply Contractors 86
7.1.3 Manufacturers 89
7.1.4 Employment 89

7.2 Conclusions 91

APPENDIX A Questionnaires 95

APPENDIX B Survey Methodology and Expansion Procedures 137

B.1 Survey Methodology 139

B.1.1 Determination of Survey Population 139
B.1.2 Questionnaire Design and Pretest 144
B.1.3 Questionnaire Administration 145

B.2 Survey Response Rates 145
B.3 Survey Results 146
B.4 Survey Expansion Procedures 146

B.4.1 Operators 151
B.4.2 Service and Supply Contractors 153
B.4.3 Manufacturers 155

APPENDIX C Survey Results 157

APPENDIX D Industry Results 181

APPENDIX E Employment Results 195

6.3 Operator Employment by Employee Category: 1985-1986 67

6.4 Part-Time and Seasonal Employment by Industry Group: 1985-1986 68

6.5 Service and Supply Contractor Industry Alberta Employment: 1984-1987 73

6.6 Service and Supply Contractor Alberta Employment by Employee Category: 1985-1986 74

6.7 Manufacturer Alberta Employment: 1984-1987 76

6.8 Manufacturer Alberta Employment By Employee Category: 1985-1986 77

6.9 Service and Supply Contractor Alberta Employment vs. Rig Activity: 1984-1986 82

7.1 Distribution of Operator Capital Expenditures in Alberta: 1984-1987 87

7.2 Service and Supply Contractor and Manufacturer Alberta Revenue: 1984-1987 88

7.3 Alberta Employment By Industry Group: 1984-1987 90

LIST OF FIGURES

2.1 Telephone Interview Response Summary 7

3.1 Comparative Canadian/U.S. Crude Oil Prices 12

3.2 Operator Crude Oil Price Forecasts: 1986-1987 14

3.3 Operator Natural Gas Price and Market Expectations 16

3.4 Operator Capital Expenditures in Canada: 1984-1987 18

3.5 Distribution of Operator Capital Expenditures in Canada by Region: 1984-1987 20

3.6 Distribution of Operator Capital Expenditures in Canada by Type: 1984-1987 22

4.1 Services Provided by Service and Supply Contractor Respondents 29

4.2 Service and Supply Contractor Revenue By Type of Service: 1984-1985 30

4.3 Service and Supply Contractor Respondent Revenue: 1984-1987 32

4.4 Crude Oil Price Forecasts by Industry Group 34

4.5 Service and Supply Contractor Total Industry Revenue: 1984-1987 42

5.1 Distribution of Manufacturers by Type of Equipment and Type of Manufacturing 46

5.2 Oil and Gas Field Equipment Manufacturer Revenue By Type of Equipment: 1984-1985 48

5.3 Oil and Gas Field Equipment Manufacturer Revenue From Alberta Based Operations: 1984-1987 50

6.1 Operator Employment: 1984-1987 63

6.2 Alberta Employment by Operator Group: 1984-1987 65

LIST OF TABLES

2.1	Telephone Interview Response Summary	6
2.2	Operator Response Rate by Category	8
6.1	Operator, Service and Supply Contractor, and Manufacturer Alberta Employment: 1984-1987	79
B.1	Operator Supplementary Telephone Interviews	141
B.2	Service and Supply Contractor and Manufacturer Personal Interviews	142
B.3	Telephone Interview Response Summary	147
B.4	Operator Response Rate by Category	148
B.5	Services Provided by Service and Supply Contractor Respondents	149
B.6	Major Type of Manufacturing of Manufacturer Respondents	150
B.7	Comparison of Operator Respondents Data to Total Industry Data: 1984	152
D.1	Crude Oil Price Forecasts by Industry Group: 1986-1987	183
D.2	Operator Natural Gas Price Forecasts (1986-1987) and Natural Gas Sales (1984-1987)	184
D.3	Operator Capital Expenditures: 1984-1987	185
D.4	Regional Distribution of Operator Capital Expenditures: 1984-1987	186
D.5	Distribution of Operator Capital Expenditures by Type: 1984-1987	187
D.6	Distribution of Service and Supply Contractor Survey Respondent Revenue by Type: 1984-1985	188
D.7	Service and Supply Contractor Survey Respondent Revenue Expectations: 1986-1987	189
D.8	Effect of Import Competition on Service and Supply Contractors	190

D.9 Service and Supply Contractor Industry Revenue: 1984-1987 191

D.10 Distribution of Oil and Gas Field Equipment Manufacturer Revenue From Alberta Based Operations by Type, 1984-1985 192

D.11 Manufacturer Expectations for Revenue From Alberta Based Operations: 1986-1987 193

D.12 Effect of Import Competition on Oil and Gas Field Equipment Manufacturers 194

E.1 Operator Employment in Canada: 1984-1987 197

E.2 Distribution of Employees by Category: 1985-1986 198

E.3 Operator, Service and Supply Contractor, and Manufacturer Alberta Employment: 1984-1987 199

E.4 Service and Supply Contractor Employment vs. Drilling Rig Activity: 1984-1986 200

LIST OF ABBREVIATIONS

The following abbreviations have been used throughout this study and are defined as follows:

NA	Not Applicable
NR	Not Reported
-	Zero
--	Amount too small to be expressed

EXECUTIVE SUMMARY

Summary and Conclusions

- The recent decline in world oil prices has had a significant negative impact on the employment, investment intentions, revenue, and business environment of the oil and gas industry in Alberta.

- Total Alberta oil and gas industry employment fell 26 percent from 89,600 in December 1985 to reach 66,170 in June 1986. A further expected decrease of 2 percent results in December 1986 employment of 64,620. This represents an employment loss of 25,000 from the previous year.

- Service and supply contractors account for over 60 percent of the total decline in employment with a total loss of 15,260 employees. Although the loss in manufacturer employment of 3,760 is less than the 5,960 loss of the operators, the decline is far more significant in percentage terms.

- Operator capital expenditures are expected to decline 32 percent or $3.5 billion from 1985 to reach $7.2 billion in 1986. A further 13 percent decrease is anticipated for 1987, resulting in capital expenditures of $6.3 billion, the lowest level since 1979 in nominal dollars. If an adjustment is made for inflation, 1987 expected expenditure levels are the lowest since 1975.

- Alberta based oil and gas field service and supply contractors expect a 42 percent decline in revenue from $3.5 billion in 1985 to $2.1 billion in 1986. A further 3 percent decrease is anticipated in 1987.

- Alberta based oil and gas field equipment manufacturers anticipate a 35 percent decrease in 1986 revenue from 1985, yielding revenue of $745 million in 1986.

- The operators have primarily cut capital expenditures in reaction to the decrease in world oil prices, making only limited employment cuts. Staff levels are still above those required for the current level of crude oil prices, and further employment cuts are expected if these prices prevail.

- The service and supply contractors and manufacturers have primarily cut employment, their largest cost item. These cuts have concentrated on production and field people, largely part-time, seasonal, and contract workers, with smaller cuts in office and administrative staff. Since some firms are questioning their viability under prevailing market conditions, further employment losses in this sector will likely occur due to bankruptcies, mergers, and acquisitions.

- Bankruptcies, mergers, and acquisitions are expected in all sectors. In the service and supply and manufacturing sectors, existing overcapacity and high inventory levels have worsened with the plunge in demand for goods and services. Some rationalization is expected, with the majority of losses in the smaller firms.

- Crude oil prices were identified as the most significant factor affecting the investment, revenue, and employment expectations of all sectors. The service and supply contractor and manufacturer crude oil price expectations are higher than those of the operators, indicating less pessimism with increasing distance from that market.

- Uncertainty and a growing pessimism are prevalent in the industry. Many firms would not specify 1987 revenue expectations and a smaller number would not provide employment estimates. Many of the service and supply contractors and manufacturers would not specify crude oil price expectations for 1986 or 1987, indicating that they are operating without a clear feeling for the principal variable affecting their business environment.

- Suggestions for government aid focussed on a floor price for crude oil or reductions in taxes and royalties. Some operators indicated that a reduction in taxes and royalties would have the same impact on their operations as a floor price for crude oil. However, government intervention in the form of short-term incentives is not welcomed.

- The downturn in the industry which followed the National Energy Program in 1981 and the uncertainty prevalent in the currently depressed market have generally resulted in a rapid, dramatic downside response on the part of firms in the industry. However, the increasing pessimism in the industry has produced a cautiousness regarding any response to an improvement in market conditions, which means that the damage being done to the oil and gas industry in Alberta will take much time to heal.

- These results are based on a survey of oil and gas operators, oil and gas field service and supply contractors, and oil and gas field equipment manufacturers conducted in June 1986. Some 96 percent of the target population of 782 responded to a quantitative telephone survey which was supplemented by detailed interviews with a sample of 100 representative firms.

Employment

- Oil and gas industry employment in Alberta is expected to decline by 25,000 from December 1985 to reach 64,620 in December 1986. Service and supply contractors account for over 60 percent of the total decrease in employment.

- Operator employment in Alberta declined 8 percent from December 1985 to June 1986 with the expectation of a further 6 percent decrease by the end of 1986. This results in December 1986 employment of 39,890 in Alberta and a total loss of 5,960 jobs in the Province.

- Pay and benefits have been cut to reduce employment costs. Benefits such as company cars, dental care programs, travel, and expense accounts have been reduced or eliminated. Only smaller operators have initiated pay cuts.

- Stable crude oil prices in the range of $20 (U.S.) per barrel would be required to reverse current employment policies. Some firms indicated that changes in the current fiscal regime would have the same impact.

- Service and supply contractor employment of approximately 34,000 in December 1985 was halved by June 1986 in response to low demand levels. The 11 percent increase expected by December 1986 is less than half of the 24 percent seasonal increase reported in 1984 and 1985. Expected employment of about 19,000 by the end of 1986 is only 55 percent of the previous year's level.

- Manufacturer employment fell 28 percent from December 1985 to reach 7,060 by June 1986. A subsequent expected decrease of 14 percent results in December 1986 employment of about 6,050.

Operators

- Operator capital expenditures are expected to be $7.2 billion in 1986, down 32 percent from the 1985 level of $10.7 billion.

- The intermediate and junior operators report the largest percentage declines in capital expenditures.

- Capital expenditures decline in all regions of Canada. However, the percentage of expenditures in Alberta increases from 59 percent in 1984 to 81 percent in 1987, largely at the expense of the East Coast Offshore and Northern Canada. Expenditures in Alberta fall $2 billion in 1986 from 1985.

- The proportion of development expenditures increases at the expense of exploration expenditures; from 44 percent in 1984 to 65 percent in 1987. Exploration expenditures of $2.2 billion in 1987 are only 45 percent of 1984 levels.

- The operator expenditure plans generally indicate a growing emphasis on development of existing and conventional landholdings in the Western Sedimentary Basin with a movement away from frontier and exploration activity.

Service and Supply Contractors

- Alberta based oil and gas field service and supply contractors expect a 42 percent decline in their 1986 revenue over 1985. This results in 1986 revenue of $2.1 billion compared with $3.5 billion in the previous year.

- Oil and gas field service and supply contractors are almost totally dependent on the petroleum industry in that 94 percent of their 1985 revenue came from providing services to the oil and gas industry.

- Personal interviews with firms revealed that demand levels are currently 50 to 75 percent below those of last year. Contractors primarily involved in exploration have been the most severely affected as demand for these services is expected to be near zero for the remainder of the year.

- Prices have fallen from 10 to 50 percent depending on the service. Firms generally acknowledge that they are operating at a loss and do

not expect the situation to improve before 1987. The geophysical contractors seem to be the most severely affected.

- Export revenue expectations are more optimistic than for total revenue, and some firms view export markets as potential sources of new revenue. The significance of this is qualified by the expectation of increasing competition in export markets and the fact that exports accounted for only 2 percent of 1985 industry revenue.

- Firms generally agreed that there is significant excess capacity in the industry even for a healthy market. Both seismic crew and drilling rig utilization rates are currently estimated at 15 percent. Some firms have already gone out of business and many more bankruptcies are expected in all sectors in the remainder of 1986, primarily among smaller firms.

- Capital expenditures have been virtually eliminated and entertainment, travel, and general office expenses have been reduced. Idle equipment is being cannibalized to keep other equipment operational, calling into question the ability of the industry to respond to sudden upturns in demand.

Manufacturers

- Alberta based oil and gas field equipment manufacturers expect 1986 revenue of $745 million, down 35 percent from $1,152 million in 1985.

- The oil and gas field equipment manufacturers are very dependent on the oil and gas industry, deriving two-thirds of their total 1985 revenue from the industry.

- Firms indicated in personal interviews that current demand is down 70 to 98 percent from 1985 levels. Manufacturers of drilling, completion, and well service equipment appear to have been the hardest hit.

- Prices are down 5 to 30 percent from year-ago levels, with exploration and predrill equipment and drilling rigs experiencing the largest declines.

- Due to the low levels of demand, there is much excess plant capacity and inventory build up. Plant utilization rates are said to be well below 50 percent for many plants. This situation is expected to worsen so that a number of firms are expected to go bankrupt. Firms with multinational affiliations are expected to have higher survival rates.

- Firms have reacted to the current market situation by eliminating capital expenditures, except for necessary maintenance, and cutting operating costs wherever possible. These have largely been employment-related costs.

Chapter 1

INTRODUCTION

The oil and gas industry is a vital sector in the Alberta and Canadian economies. The contribution of Alberta's mining industry alone accounted for 26 percent of Alberta's gross domestic product (GDP) and 3.5 percent of Canadian GDP in 1984.[1] Some 95 percent of the value of production by Alberta's mining sector in 1984 was accounted for by crude oil, natural gas, and natural gas liquids.[2] In addition, natural resource royalties represented almost 9 percent of Alberta GDP in 1984. In comparison, agriculture's contribution to 1984 Alberta GDP was only 3.4 percent, with construction and services amounting to 5 percent and 14 percent, respectively.

These figures indicate the importance of Alberta's petroleum and natural gas industry to the economies of Canada and Alberta. The health of this sector clearly has national implications as well as particular impacts on the Alberta economy. Therefore, the potential impact of the recent decline in world oil prices on this sector will have repercussions across the country.

1.1 Background to the Study

The recent decline in world oil prices has already had a profound impact on the activities of Alberta's oil and gas industry. The initial effect of lower revenue on the part of the operators generally translates into lower capital expenditures which, in turn, affects oil and gas field service and supply contractors and equipment manufacturers. While the effects of lower prices are evident, particularly in Alberta where most firms are based and most activity occurs, the total impact on each sector is not immediately apparent. Therefore, the governments of Alberta and Canada commissioned this study to determine the impact of lower oil and gas prices on the oil and gas industry in Alberta.

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[1]Alberta Bureau of Statistics, "Alberta Economic Accounts 1984."
[2]Alberta Bureau of Statistics, "Alberta Statistical Review, Fourth Quarter, 1985."

1.2 Study Objectives

The three primary objectives of the study are:

(1) to quantify both the impact of lower oil and gas prices on oil and gas operator capital expenditures and the implications of these lower expenditures for the oil and gas field service and supply contractors and equipment manufacturers;

(2) to examine the expectations of the service and supply contractors and manufacturers regarding the demand, supply, price, and level of competition in their markets; and

(3) to quantify the implications of lower oil and gas prices on employment by the operators, service and supply contractors, and manufacturers.

1.3 Study Overview

Chapter 2 outlines the study scope and methodology. The impact of lower oil and gas prices on oil and gas operator capital expenditures is discussed in Chapter 3. The subsequent impact on the oil and gas service and supply contractors and manufacturers is outlined in Chapters 4 and 5, respectively. Chapter 6 analyzes the impact on employment in all three industry sectors. The study results are summarized in Chapter 7 with particular emphasis on the impact in Alberta.

The appendices provide the background material and data that support the text. Appendix A contains copies of the questionnaires used to collect the requisite information. Appendix B outlines in detail the methodology employed in administering the surveys. Aggregated survey results are provided in Appendix C. Total industry results for each industry group are given in Appendix D. Finally, Appendix E details employment data for the total industry.

Chapter 2

STUDY SCOPE AND METHODOLOGY

2.1 Scope

The study examines the impact of lower oil and gas prices on the three primary industry groups involved in the oil and gas industry; operators, oil and gas field service and supply contractors, and oil and gas field equipment manufacturers. Both quantitative and qualitative information collected from all three groups provide the data for the study, generally covering the 1984 to 1987 period (i.e., historical, current, and projected data).

Oil price expectations for the remainder of 1986 (June to December) and for 1987 were collected from all three groups. In addition, operators reported natural gas price expectations and historical and expected gas sales to further specify that sector's expectations.

The price and market expectations provide perspective for the financial and employment information supplied by the industry. The operators specified their historical and projected capital expenditures by region and by type (exploration or development). Both the service and supply contractors and the manufacturers outlined their historical and expected total revenue and export revenue by type of service/equipment. All three groups provided historical and projected employment data.

The study examines oil and gas industry exploration and development activity. While the installation of production facilities is included in development activity, operating expenditures associated with production are not included in the analysis. Land expenditures and geological and geophysical expenditures are specified separately to enable comparison of the operator capital expenditure figures with national accounts data.

2.2 Methodology

The quantitative information was collected by means of a telephone survey of the three industry groups (see Appendix A). The

oil and gas operators include firms involved in the exploration for and/or production of crude oil or natural gas. The oil and gas field service and supply contractors comprise firms which provide services or supplies to operators. Relevant services include the following:

- aerial photography and mapping
- geophysical contracting
- drilling rig contracting
- service rig contracting
- supply stores
- other drilling and oilfield services such as:
  - logging
  - testing
  - coring
  - well stimulation
  - cementing
  - trucking
  - oilfield construction
  - mud

The oil and gas field equipment manufacturers include firms which manufacture equipment for the operators and service and supply contractors. These firms manufacture three types of oil and gas field equipment including:

- exploration or predrill equipment,
- drilling, completion, or well service equipment, and/or
- production equipment.

The manufacturers are classified by four types of manufacturing:

- metal fabricating,
- machinery,
- transportation equipment, or
- electronics.

The firm lists were compiled from several sources. The operator lists included firms from industry association membership lists as well as other major non-member firms. The service and supply contractor and manufacturer lists were provided by Alberta Economic Development. The manufacturer list is deemed to be comprehensive of that industry sector. The operator and service and supply contractor

lists constitute non-random samples. The former omits many smaller firms and the list of manufacturers is based on an earlier limited survey conducted by Alberta Economic Development.

The initial lists included 886 firms. This was reduced to 782 by deleting firms which were out of business or which were not applicable to the study (see Table 2.1). Firms which do not currently provide services or manufacture goods for the oil and gas industry were deleted from the service and supply contractor and manufacturer lists. For the operator lists, firms were deleted largely because they had only downstream operations or were consultants to the industry and not actually involved in oil and gas exploration or production. The remaining firms constitute the target population, the list of firms relevant to the study.

Of the total target population of 782, only 35 firms refused to provide information or could not be contacted. Thus, the overall response rate was 96 percent. Figure 2.1 depicts the response of the target population by industry group.

The operators were divided into four size groups by the Alberta Department of Energy according to their type and level of activity; integrated, senior, intermediate, and junior producers. Integrated operators include those with refining operations. The remaining operator groups were identified by their 1985 levels of capital expenditures, employment, and annual natural gas sales. In general, senior operators have a minimum of $100 million in annual capital expenditures, 200 employees, and 15 billion cubic feet of natural gas sales. Junior operators generally have a maximum of $10 million in annual capital expenditures, 20 employees, and 3 billion cubic feet of natural gas sales. The intermediate operators generally fall between the criteria for the senior and junior operators. In some cases, the initial placement of a firm in a given operator group was changed on the basis of its survey results. As indicated in Table 2.2, the survey response was representative of all four groups.

Additional qualitative information was gathered through 34 supplementary telephone interviews with operators, and 33 personal interviews with each of the two other groups. The operators provided information on employment measures taken in response to the decline in oil and gas prices. The service and supply contractors and manufacturers discussed their current market situation in regards to supply, demand, and price, and their reaction to the current market situation in regards to operating costs, capital expenditures, and diversification.

TABLE 2.1

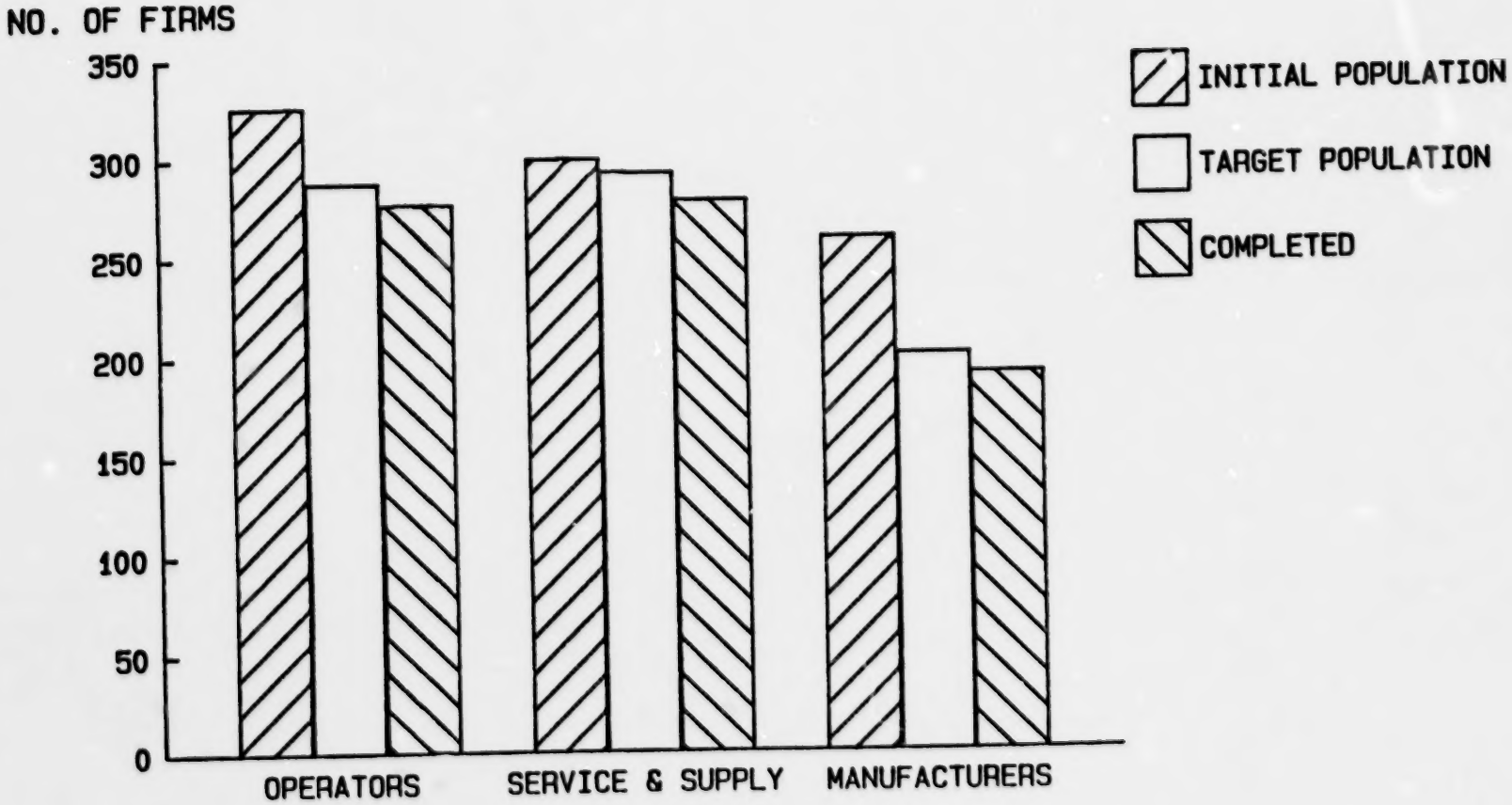
TELEPHONE INTERVIEW RESPONSE SUMMARY

	Operators	Service and Supply	Manufacturers	Total
Initial Population	326	300	260	886
Less: Deletions	37	33	19	89
Out of Business	1	9	5	15
Transfers[a]	-	(35)	35	-
Target Population	288	293	201	782
Refusals[b]	10	12	8	30
Not Contacted	1	2	2	5
Completed	277	279	191	747
Completed/Target Population (%)	96.2	95.2	95.0	95.5

[a]Companies initially listed as manufacturers that were actually service or supply contractors, or vice versa.

[b]Includes one manufacturer and three service and supply contractors whose responses were sent in the mail but not received in time to be included in the database.

FIGURE 2.1
TELEPHONE INTERVIEW RESPONSE SUMMARY



Source: Table B.3

TABLE 2.2

OPERATOR RESPONSE RATE BY CATEGORY

Operator Category	Respondents		Total		Respondents/Total (%)
	(No.)	(%)	(No.)	(%)	
Integrated Producers	7	2.5	7	2.4	100.0
Senior Producers	23	8.3	24	8.3	95.8
Intermediate Producers	41	14.8	43	14.9	95.3
Junior Producers	206	74.4	214	74.3	96.3
Total	277	100.0	288	100.0	96.2

Rather than providing price scenarios for the various industry groups, each firm was asked to report their own crude oil price expectations for the remainder of 1986 (June to December) and for 1987. In addition, the operators specified natural gas prices for the same time periods. In all cases, respondents were asked for their expectations as opposed to their hopes or desires.

The operators specified crude oil prices in Canadian dollars per barrel at Edmonton and natural gas prices in dollars per thousand cubic feet at the Alberta border as they would be the most familiar with these prices. By the same token, the service and supply contractors and manufacturers were asked to provide their crude oil price expectations in U.S. dollars per barrel. The service and supply contractor and manufacturer prices would be comparable to the "typical" crude oil price; West Texas Intermediate (WTI) at Chicago. Their reported prices were converted to Canadian dollars using $0.71 U.S. per Canadian dollar for 1986 and 1987, and then reduced by a transportation charge of $1.25 (Cdn.) per barrel and an import fee of $0.15 (Cdn.) per barrel to make them comparable with the operator results.

The results from the telephone survey responses were first aggregated to derive sample totals. The sample totals were then expanded to account for non-respondents and firms not included in the lists to estimate totals for the entire industry. Expansion factors were largely derived from total industry data on expenditures and employment available from Statistics Canada and industry associations. The derivation of these expansion factors is discussed in Appendix B. The aggregated sample totals for each group are provided in Appendix C. Detailed industry results are outlined in Appendices D and E. The figures discussed in the remainder of the study are estimates for the total industry unless otherwise noted.

It should be noted that the 1987 estimates are less reliable than those for previous years due to the larger number of firms which would not provide estimates for that year. All of the integrated operators provided answers to all of the questions. The junior operators accounted for the vast majority of operator non-responses to any given question for 1987, likely due to their smaller staff contingents and greater uncertainty regarding their future plans. The number of non-respondents to each question is provided with the aggregated survey results in Appendix C.

Chapter 3

THE OIL AND GAS OPERATORS

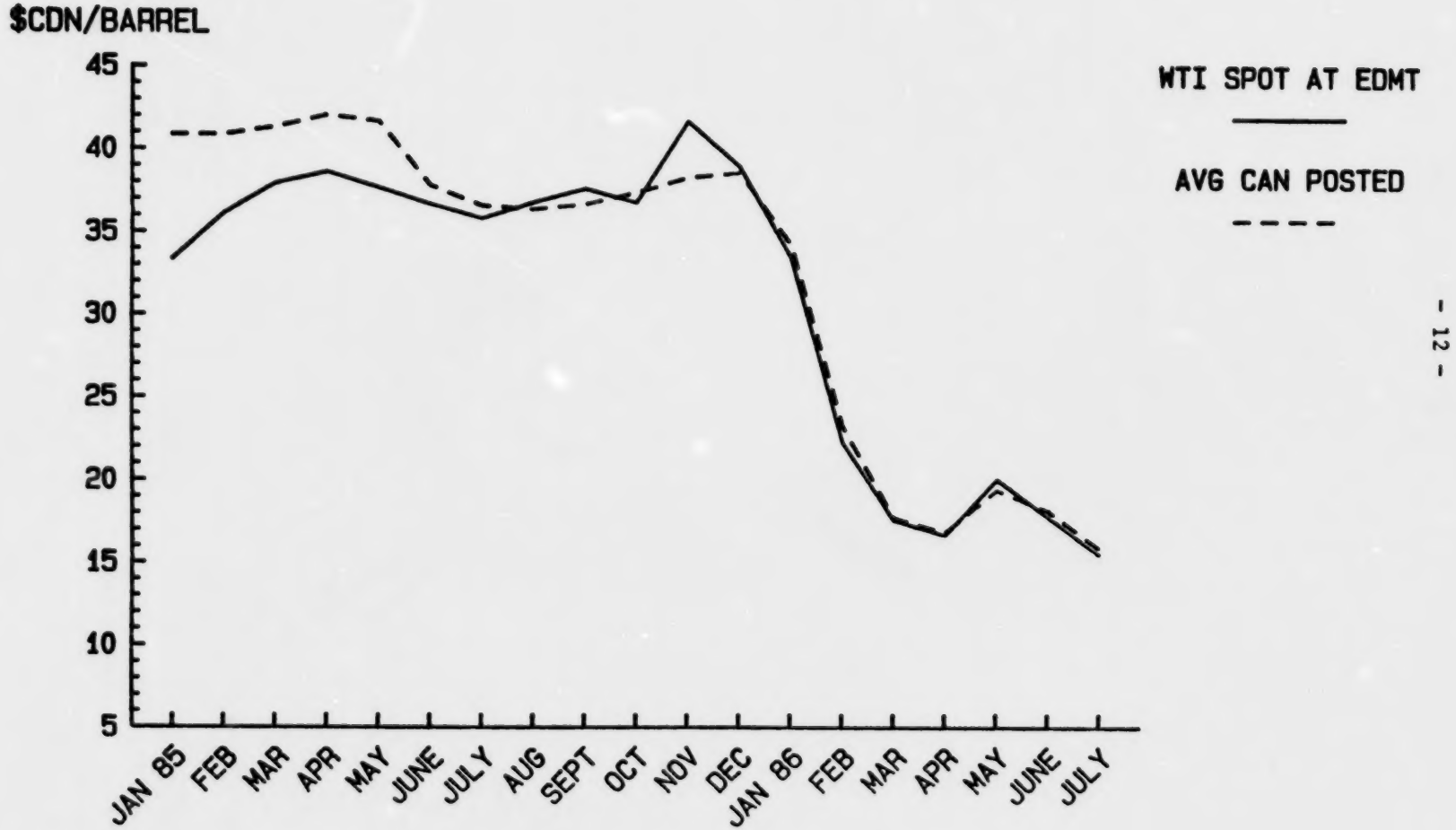
The oil and gas operators are the first to feel the effects of changes in crude oil and natural gas prices. As a direct result of the recent decline in crude oil prices, the 1986 capital expenditures planned by the oil and gas operators are only $7.2 billion, down 32 percent from the 1985 level of $10.7 billion. Capital expenditures in Alberta alone are expected to fall $2 billion in 1986 from 1985 levels. East Coast Offshore expenditures are anticipated to be less than 60 percent of 1985 levels in 1986. An increasing emphasis is planned on development as opposed to exploration activities with the percentage of total capital expenditures on development and production facilities increasing in both 1986 and 1987. This is reflected in the 58 percent decline reported for land expenditures between 1985 and 1986, and the increasing percentage of capital expenditures in more developed regions such as Alberta.

In addition to the above, employment by the oil and gas operators has been affected by lower crude oil prices. These results will be discussed in Chapter 6. This chapter outlines the crude oil and natural gas price and market expectations of the oil and gas operators and their resultant capital expenditure intentions. The data presented are industry estimates derived from the results of the telephone survey of 277 operators (see Section B.4.1). Comments are provided to interpret or provide background to the survey results. The supplementary operator interviews covered employment issues only and, therefore, are presented in Chapter 6.

3.1 Price and Market Expectations

Canadian light, sweet crude oil prices averaged $35.98 (Cdn.) [$26.36(U.S.)] per barrel at Edmonton in 1985 (see Figure 3.1). After crude oil prices were deregulated in June of 1985, Canadian prices closely paralleled the price of the North American benchmark crude, West Texas Intermediate (WTI). Netting back WTI from Chicago, adjusting for transportation costs and exchange rates, shows the close relationship between Canadian and world crude oil prices.

FIGURE 3.1
COMPARATIVE CANADIAN/U.S. CRUDE OIL PRICES



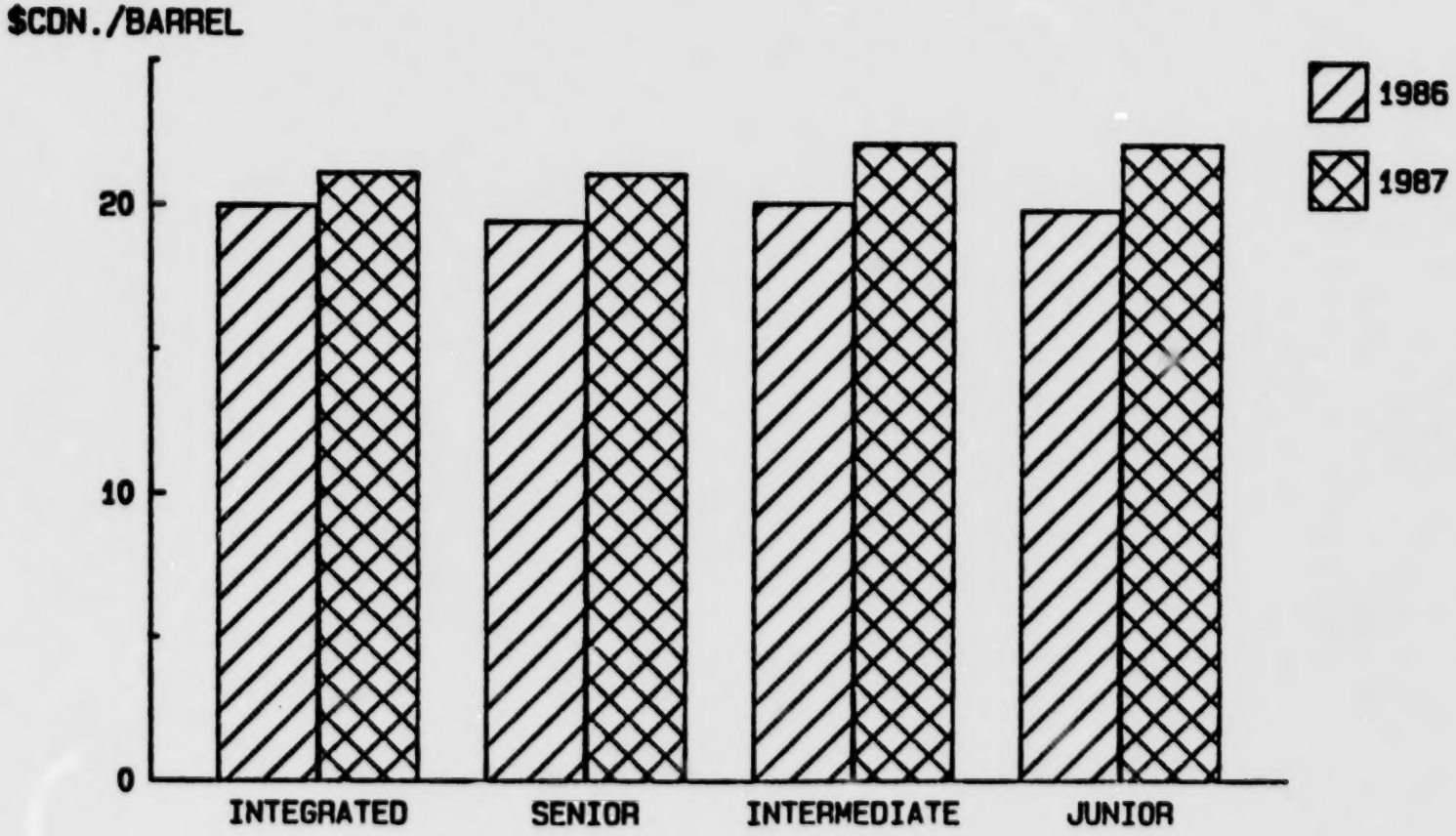
Source: Canadian Energy Research Institute

As a result of this relationship, Canadian crude oil prices followed the decline in world oil prices in 1986 (see Figure 3.1). Average Canadian crude oil prices at Edmonton fell by more than 50 percent from a peak of $38.41 (Cdn.) per barrel in November 1985 to $17.40 (Cdn.) per barrel in March and April of 1986. The average price in June 1986, when the telephone survey was conducted, was $17.77 (Cdn.) per barrel. In this environment, the respondents specified an average expected crude oil price (at Edmonton) of $19.86 (Cdn.) per barrel for the remainder of 1986, or about $14.10 (U.S.) per barrel (see Figure 3.2). This is comparable to a "typical" crude oil price (West Texas Intermediate at Chicago) of $15.10 (U.S.) per barrel.

Although all of the operator groups specified very similar 1986 crude oil prices, the integrated and senior operators expect a lower 1987 crude oil price of approximately $21.10 (Cdn.) per barrel (see Figure 3.2). The two smaller operator groups expect a higher 1987 price of about $22.15 (Cdn.) per barrel. This difference between the groups likely reflects the generally more conservative nature of the larger operators but could also be a function of their having staff which can devote more time to the analysis of the world oil market. This latter observation is supported by the fact that virtually all of the intermediate and senior operators specified their firm's price forecasts while 15 percent of the junior operators would not specify a 1987 price. Moreover, the junior operators reported the greatest range of prices in both time periods; $12.00 to $38.00 (Cdn.) per barrel in 1986 and $15.00 to $36.00 (Cdn.) per barrel in 1987. As a group, the operators expect an average increase in crude oil prices of 10.9 percent, rising from $19.86 (Cdn.) per barrel in 1986 to $22.02 (Cdn.) per barrel in 1987.

Canadian natural gas prices are currently fixed under a federal/provincial government agreement which has maintained the Alberta Border price at about $2.99 per thousand cubic feet (Mcf) throughout 1985 and 1986. The deregulation of natural gas markets which began with the signing of the Western Accord in the spring of 1985 will be extended as of November 1, 1986. This further deregulation will allow negotiated prices for domestic and export sales of Canadian natural gas. Natural gas prices in the U.S., Canada's sole export market, are considerably lower than Canadian prices due to the gas-to-gas and interfuel competition prevalent in a deregulated market. Thus, with open competition in both Canadian and U.S. markets after November 1, 1986, Canadian natural gas prices are generally expected to decline.

FIGURE 3.2
OPERATOR CRUDE OIL PRICE FORECASTS: 1986-1987



Source: Table D.1
Note: Crude oil prices at Edmonton.

In light of this situation, the operators expect an average natural gas price of $2.16 (Cdn.) per Mcf for the remainder (June to December) of 1986 (see Figure 3.3). The average 1987 price is lower by $0.30 to $0.40 per Mcf, likely because the 1986 average price would include about four months of the higher regulated price. The junior operators report the lowest 1986 and 1987 prices; $2.09 and $1.81 per Mcf, respectively. This could be indicative of the fact that, in the recent past, smaller producers have sold a larger proportion of their natural gas production on the short-term market in contrast with larger producers which sell more of their gas under long-term contracts. Gas under contract (system gas) receives a fixed price set by the contract, whereas gas not under contract receives market price which is subject to competition and typically less than contract prices. The fact that virtually all gas will be sold in competitive markets by the end of 1986 is reflected in the very similar prices reported by the various operator groups for 1987. However, greater uncertainty is associated with natural gas prices than with crude oil prices with about 11 percent of operators not specifying a 1986 natural gas price as opposed to the less than 4 percent of operators who did not specify a 1986 crude oil price. Here, too, the vast majority of non-respondents were junior operators.

Despite the decrease in natural gas prices, all four operator groups expect their natural gas sales to increase in both 1986 and 1987. This is likely attributable to optimism regarding their ability to sell their natural gas production in a deregulated setting and a perception of stable domestic and stable or increasing export sales growth. Since natural gas export sales to the U.S. account for about one-third of Canadian sales, and export sales in the first half of the 1985/86 contract year are down about 15 percent from the same time last year, it is not clear that the expectations of higher sales will be realized.[1] The projections of increasing sales volumes may simply be indicative of a perceived need to sell greater volumes, given the expected decline in prices, rather than a forecast based on analysis of market forces.

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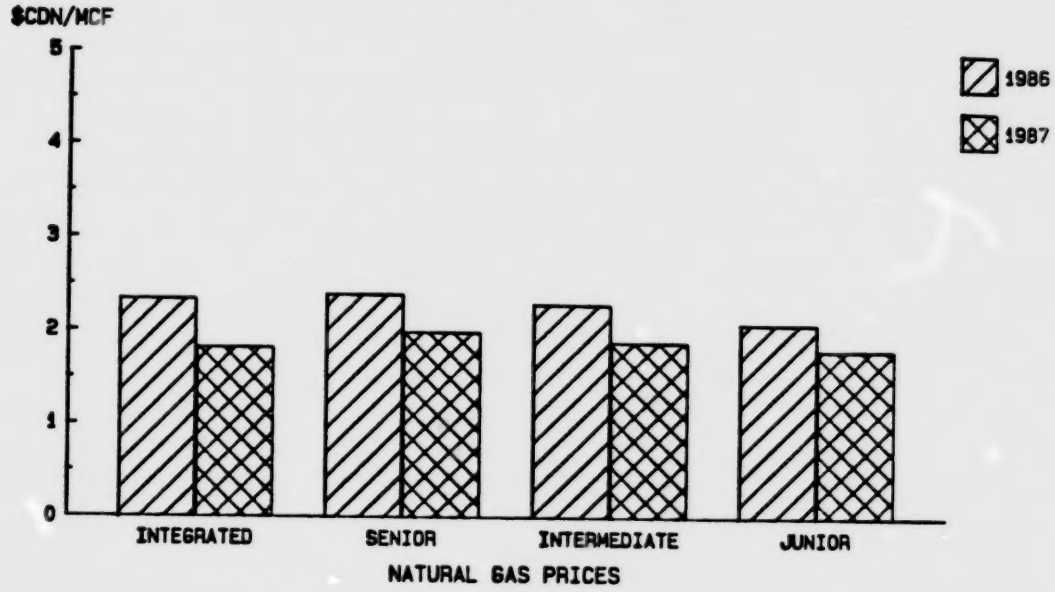
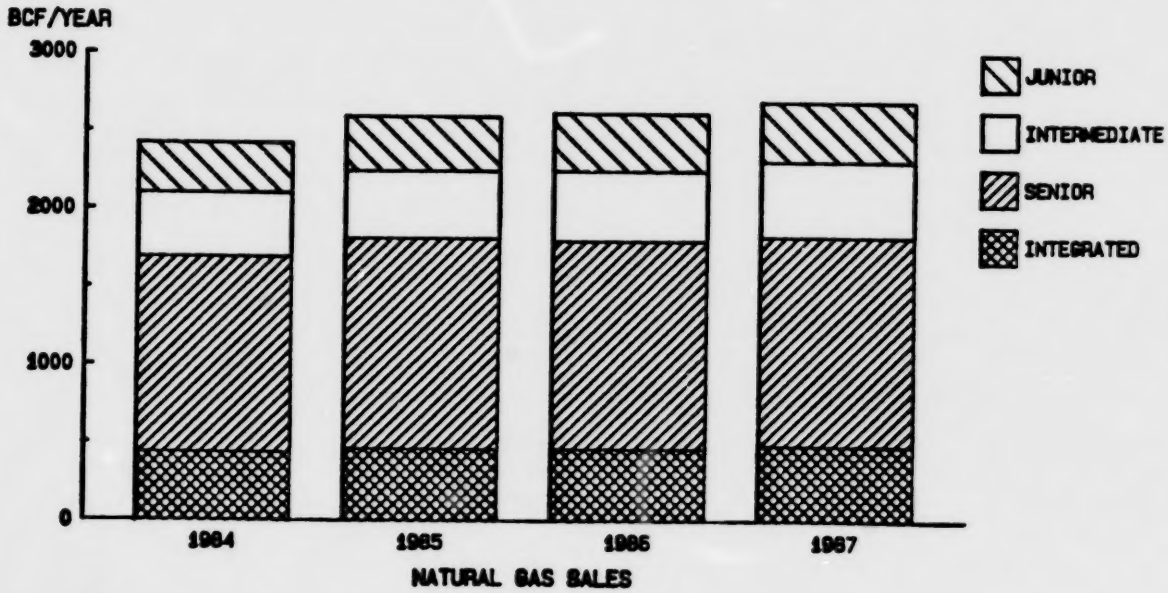
[1]National Energy Board Reports GA43 and GB50.

FIGURE 3.3
OPERATOR NATURAL GAS PRICE AND MARKET EXPECTATIONS





Source: Table D.2
Note: Natural gas prices at the Alberta border.

3.2 Capital Expenditures

The price and market expectations outlined above provide a perspective on operator capital expenditure plans. The low level of crude oil prices, the relatively small price increases expected, and the anticipated decline in natural gas prices are evident in operator capital expenditure plans. While total capital expenditures increased more than 20 percent from 1984 levels to reach $10.7 billion in 1985, a 32 percent decline is expected in 1986 (see Figure 3.4). A further 13 percent decrease is expected in 1987, reducing 1986 capital expenditures of $7.2 billion to only $6.3 billion in 1987, the lowest level since 1979 in nominal dollars. If an adjustment is made for inflation, 1987 expected expenditure levels are the lowest since 1975.[2]

It is possible that the decline in capital expenditures is worse than what it might have been due to an acceleration of expenditures in 1985 and the first quarter of 1986 to take advantage of Petroleum Incentive Program (PIP) grants. However, this conjecture was not substantiated by the results of a survey of major oil and gas operators undertaken in early 1986 before the dramatic decline in world oil prices.[3]

The percentage decline in 1986 capital expenditures reported by the intermediate and junior operators is considerably greater than that expected by the two larger operator groups (see Figure 3.4). Moreover, the 47 percent decline expected by the junior operators in 1986 is followed by a larger than average decrease of 17 percent in 1987. While this follows from the lower natural gas prices expected by this group, it seems to contradict their expectation of a larger crude oil price increase. This apparent contradiction is likely attributable to the more limited cash flow of the smaller firms which necessitates more dramatic cuts in capital expenditures. In addition, the junior operators account for most of the firms which would not specify their 1987

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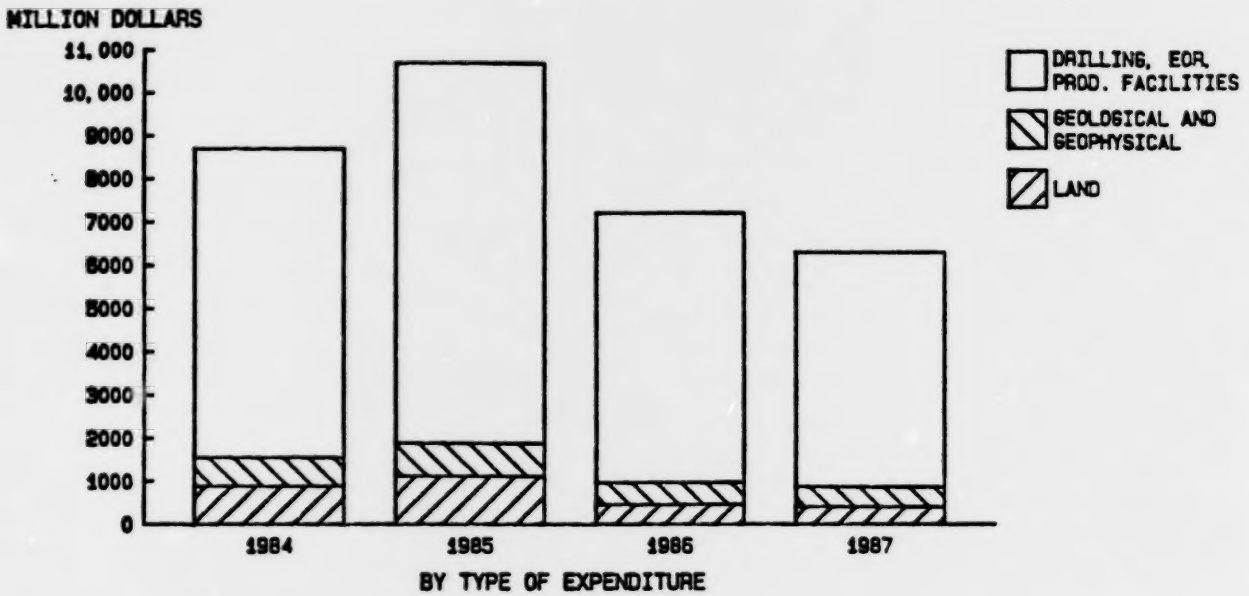
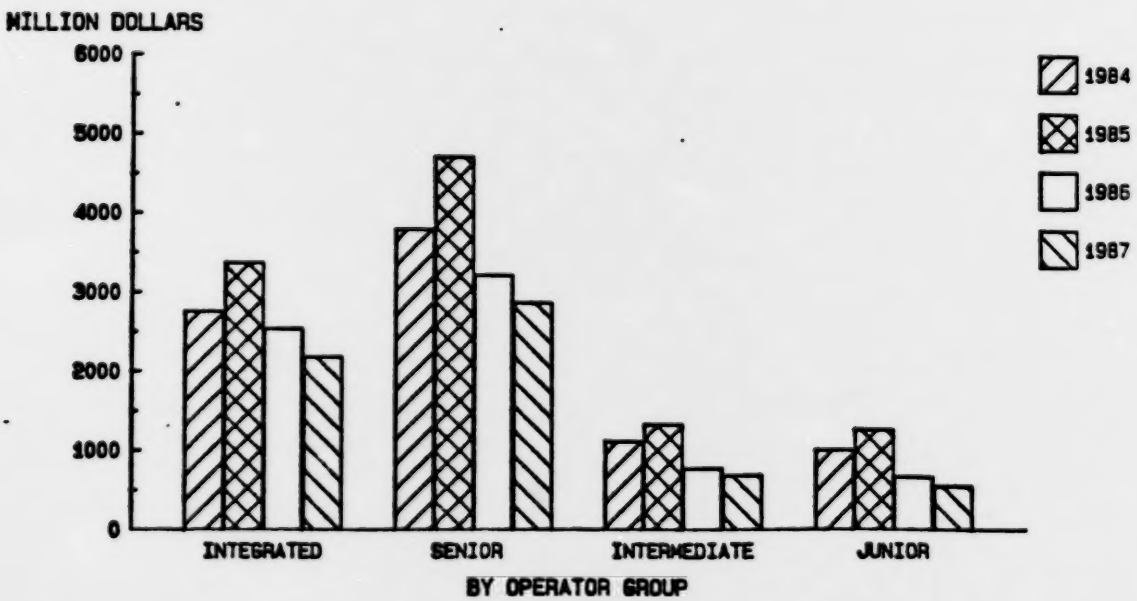
[2]Canadian Petroleum Association, "CPA Statistical Handbook," Section IV, Tables 2B and 14. Expenditures were deflated using the CPA capital cost index.

[3]Canadian Energy Research Institute Research Report 86-1, "The Effect of the Western Accord and Recent Provincial Royalty Changes on Petroleum Industry Capital Expenditures," pp. 9, 18.

FIGURE 3.4
OPERATOR CAPITAL EXPENDITURES IN CANADA
1984-1987





Source: Table D.3

capital expenditure plans. Over one-quarter of the junior operators did not provide 1987 capital expenditure figures.

3.2.1 Regional Distribution of Capital Expenditures

In addition to changing levels of capital expenditures, the regional distribution is also expected to change. The percentage of expenditures in Alberta increases from 59 percent in 1984 to 81 percent in 1987, largely at the expense of Northern Canada and the East Coast Offshore (see Figure 3.5). This trend is attributable to several factors including the relatively lower exploration and development costs associated with the Western Sedimentary Basin as opposed to the frontiers and the phasing out of PIP grants which had significantly contributed to frontier exploration. Similar results were reported in an earlier study. Over 70 percent of the 107 respondents to that survey expected an increase in their onshore exploration and development activity in the long term (1987 to 1990).[4]

The integrated and senior operators report a more dramatic increase in their percentage of capital expenditures in Alberta because of reductions in their extensive involvement in the East Coast Offshore and Northern Canada. Alberta is the sole beneficiary of this trend.

Despite the increases reported for the percentage of capital expenditures in Alberta, actual capital expenditures in Alberta decline substantially such that 1987 capital expenditures of $5.1 billion are only 71 percent of the 1985 level and less than 1984 expenditures (see Figure 3.5). Capital expenditures in B.C. are expected to fall similarly while Saskatchewan expenditures fall more dramatically; 59 percent between 1985 and 1987. By 1987, East Coast Offshore expenditures fall to $324 million, 28 percent of 1985 levels. Northern Canada expenditures fall to 18 percent of 1985 levels or $164 million. Only minimal expenditures are planned for Manitoba in 1986 and 1987.

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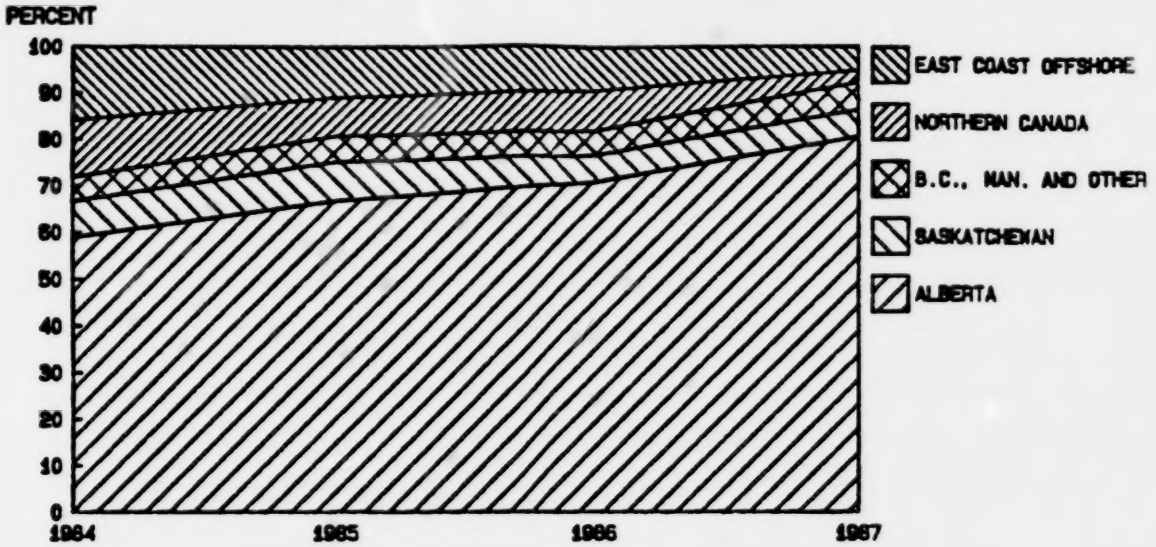
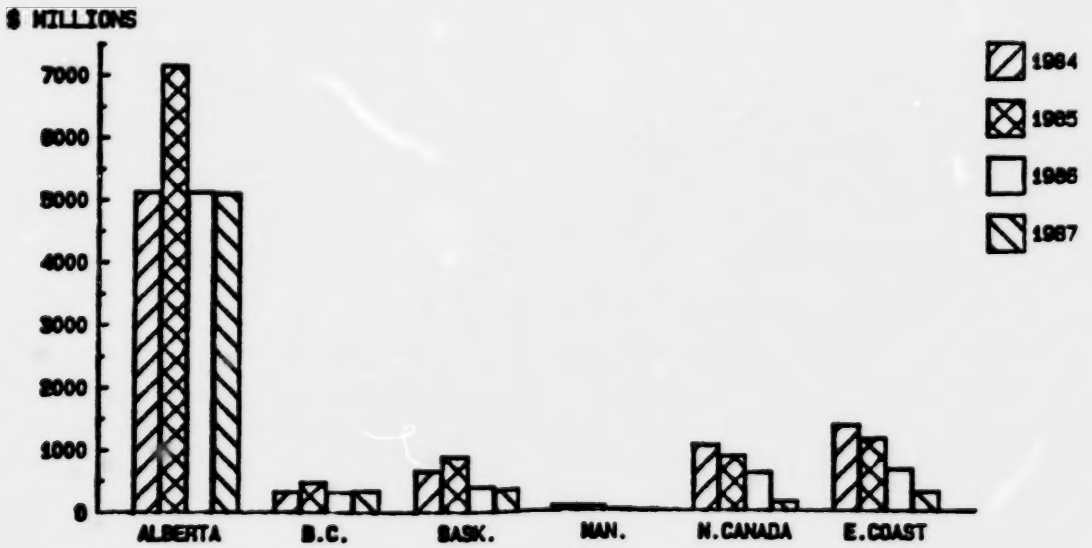
[4]Canadian Energy Research Institute Research Report 86-1, "The Effect of the Western Accord and Recent Provincial Royalty Changes on Petroleum Industry Capital Expendiutres," p. 14.

FIGURE 3.5
DISTRIBUTION OF OPERATOR CAPITAL EXPENDITURES
IN CANADA BY REGION: 1984-1987





Source: Table D.4
Note: Weighted average distributions.

3.2.2 Distribution of Capital Expenditures by Type

As previously noted, natural gas production is expected to increase modestly despite the expected decline in natural gas prices. This is consistent with the increasing proportion of total capital expenditures for development activities, including production facilities, as opposed to exploration activities (see Figure 3.6). The proportion of total capital expenditures on development increases from 44 percent in 1984 to 65 percent in 1987.

In dollar terms, both exploration and development expenditures decrease significantly between 1985 and 1986. However, exploration expenditures continue to fall in 1987 while development expenditures increase slightly. In 1986, planned exploration expenditures are $3.2 billion, a 37 percent decline from 1985, and development expenditures are $4.1 billion, down 29 percent from 1985.

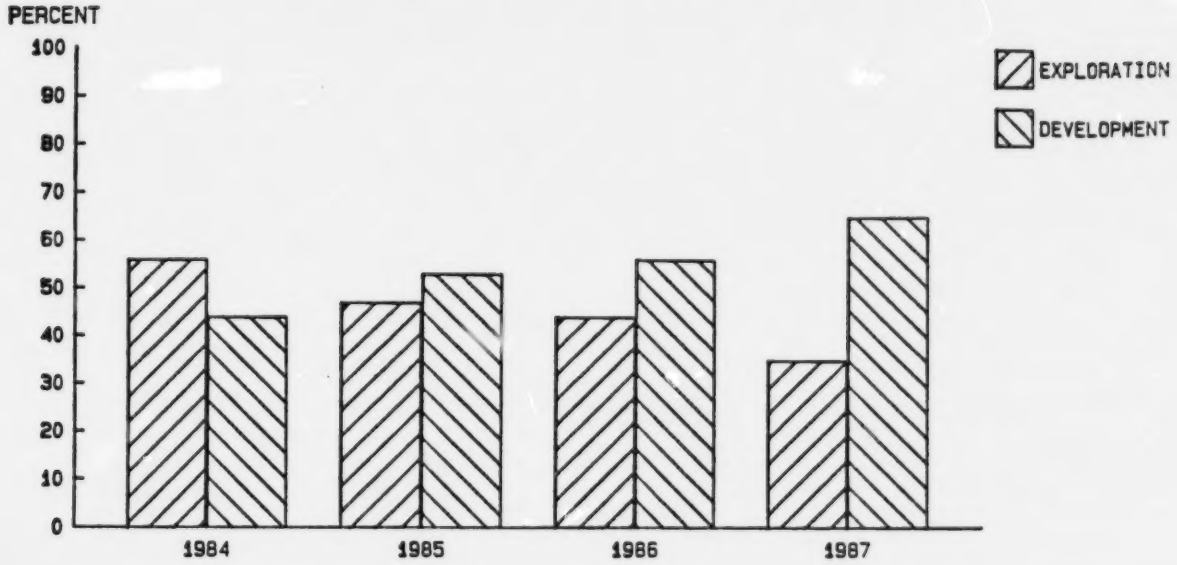
The trend towards development and production expenditures is an expected result of lower crude oil prices as oil and gas operators seek to maximize their short-term cash flow with minimal risk. Given the revenue decrease experienced by the operators, expenditures with relatively short-term payback periods will be emphasized over more long-term undertakings such as many exploration projects. This explains both the increasing percentage of expenditures on development and the decreasing percentage on frontier exploration.

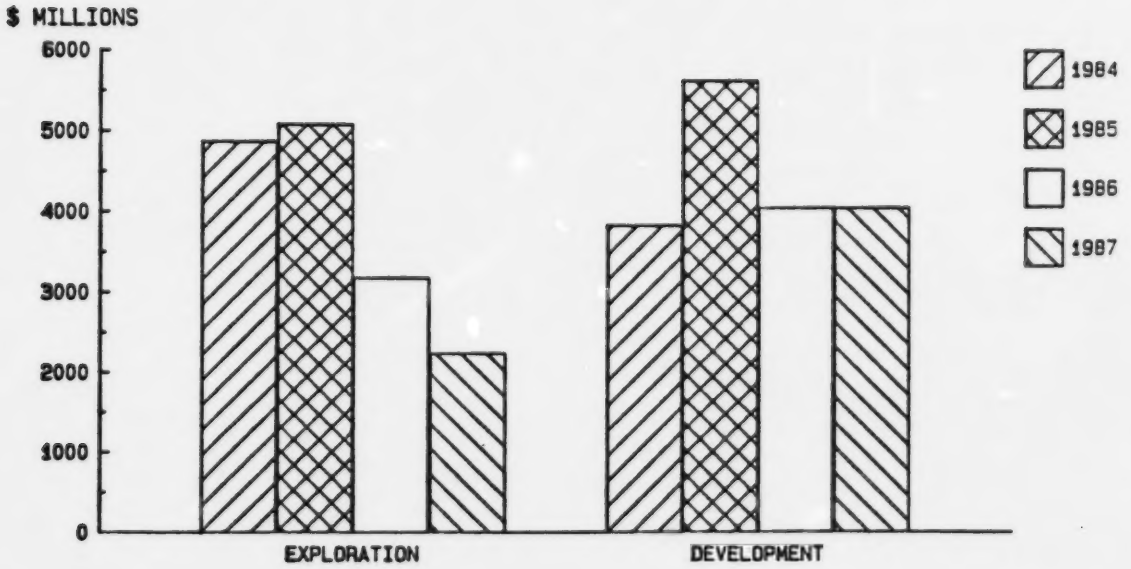
The trend towards development expenditures is followed by all operator groups to varying degrees (see Table D.5). The intermediate and junior operators report a lower proportion of capital expenditures on exploration initially and larger portions on exploration at the end of the period relative to the two larger operator groups.

The greater emphasis on development as opposed to exploration is also evident in the low levels of land and geological and geophysical expenditures expected in 1986 and 1987. Land expenditures fall 58 percent in 1986 from $1.1 billion in 1985. A further reduction of 11 percent is expected in 1987, resulting in land expenditures of only $430 million in that year.

The senior operators account for about 40 percent of total land expenditures in all years and record the largest percentage decrease between 1985 and 1986. Their land expenditures decline 66 percent from

FIGURE 3.6
DISTRIBUTION OF OPERATOR CAPITAL EXPENDITURES IN CANADA BY TYPE: 1984-1987





rce: Table D.5
: Weighted average distributions

the 1985 level of $466 million to reach $158 million in 1986. However, the senior operators are the only operator group which expects an increase in land expenditures in 1987. Since this optimism is not evidenced by any of the other groups, this could indicate an expectation of valuable opportunities to purchase land in a relatively depressed market for long-term prospects, and also reflects their relatively stronger financial positions.

The junior operators also record large decreases in land expenditures. Although they accounted for approximately the same dollar amount of 1985 land expenditures as the integrated and intermediate operators, their 1987 land expenditures are only about 60 percent of those of the two other groups; $58 million compared with $103 and $94 million, respectively (see Table D.3).

The net result of these decreases is a decline in the percentage of land to total expenditures from 11 percent in 1985 to 7 percent in both 1986 and 1987. The intermediate and junior operators report relatively larger decreases of 5 and 8 percentage points, respectively, both from a 1985 level of 18 percent. The integrated operators basically maintain their percentage of land expenditures at about 5 percent while the senior operators parallel the pattern of the total industry.

Land expenditures represented 23 percent of total exploration expenditures in 1985 but account for one-third of the decrease in total exploration expenditures from 1985 to 1986. Thus, what exploration activity is continuing will occur moreso on existing landholdings. Such a scenario has long-term implications for the exploration of Canada's petroleum and natural gas resources.

Geological and geophysical expenditures are also expected to decrease over the period, though not as dramatically as land expenditures (see Figure 3.4). Geological and geophysical expenditures are expected to fall by one-third from 1985 to reach $513 million in 1986. Only a 9 percent decrease is expected in 1987 over 1986.

The integrated and senior operators account for about 80 percent of total geological and geophysical expenditures. Thus, while the intermediate and junior operators report the largest percentage declines of 60 percent from 1985 to 1987, the absolute amount of the decline in both of these cases is comparable to that of the integrated operators who expect a 22 percent decrease from 1985. The senior

operators report a 40 percent decrease over the same period, virtually all of which occurs in 1986.

This decrease in geological and geophysical expenditures is also indicative of less activity in unexplored areas. However, the percentage of geological and geophysical expenditures to total expenditures remains constant at 7 percent and the percentage of total exploration expenditures increases from 15 percent in 1985 to 21 percent in 1987. It would appear, therefore, that further geological and geophysical activity will occur on existing landholdings as well as on future land purchases. While the areal extent of exploration may be significantly diminished, the active areas will still be explored.

3.3 Summary

The low crude oil and natural gas prices expected by Canadian oil and gas operators are reflected in their capital expenditure plans. A 32 percent decline is expected from the 1985 level of $10.7 billion to reach $7.2 billion in 1986. A further 13 percent decrease is reported for 1987, resulting in capital expenditures of only $6.3 billion in that year.

Despite a regional shift in capital expenditures in percentage terms towards Alberta at the expense of the East Coast Offshore and Northern Canada, the absolute level of capital expenditures decreases significantly in all regions. Total expected 1987 capital expenditures of $324 million in the East Coast Offshore are only 28 percent of 1985 levels, and Northern Canda expenditures of $164 million in that year are only 18 percent of the 1985 figure.

Development expenditures, including production facilities expenditures are expected to represent an increasing proportion of total expenditures. This is consistent with the fact that natural gas sales are expected to increase modestly to 1987 despite an expected decrease in price.

The levels of both land and geological and geophysical expenditures, are expected to decline. In particular, land expenditures are expected to decline 58 percent in 1986 over 1985. A further 11 percent decline in 1987 yields land expenditures of only $430 million in that year, less than 40 percent of the 1985 level of $1.1 billion.

These trends indicate an increasing emphasis on the development of existing landholdings in conventional areas. This has significant implications for the long-term exploration of frontier areas as well as unexplored areas of the Western Sedimentary Basin. However, an increasing proportion of geological and geophysical expenditures to total exploration expenditures with a simultaneous decline in land expenditures indicates that existing landholdings will be explored further.

In addition to the above, the reported reductions in capital expenditures will have profound impacts on the oil and gas field service and supply contractors and equipment manufacturers. The expectations of these two groups will be discussed in the two subsequent chapters.

Chapter 4

THE IMPACT ON SERVICE AND SUPPLY CONTRACTORS

The service and supply industry has been severely affected by the recent decline in world oil prices. Survey results indicate that total revenue for the industry will be some 42 percent lower in 1986 than it was in the previous year. Price cuts have been dramatic and the volume of sales for all types of services is 50 to 80 percent lower than it was in 1985.

Market conditions have forced almost all service and supply contractors to make significant reductions in operating and capital expenditures. Layoffs have been extensive and most companies have made pay and benefit cuts. In general, capital spending has been virtually eliminated and the only expenditures which are being made are those involving necessary maintenance of equipment.

Some companies have been pushed into bankruptcy with more expected to follow. While this may be viewed in some service categories as a positive move which will rationalize an overbuilt industry, there is a fear that the Canadian service and supply industry may almost disappear.

This chapter details the impact on the oil and gas field service and supply contractors. Section 4.1 discusses the telephone survey results for the group of 279 respondents only. (Industry estimates are provided in Section 4.3.) The personal interview survey results are presented in the Section 4.2. Finally, Section 4.3 summarizes and evaluates all the results and provides industry estimates for the total oil and gas field service and supply sector.

It must be noted that the firms surveyed constitute a sample of the oil and gas field service and supply contractors based in Alberta. Revenue figures exclude revenue from out of province subsidiaries but would include revenue generated by out of province activity.

4.1 Telephone Interview Results

4.1.1 Type of Service

As indicated in Figure 4.1, the oil and gas field service and supply contractors provide a wide variety of services to the oil and gas industry. About 15 percent of firms primarily provide geophysical contract services, and another 15 percent provide drilling rig contract services. Over 10 percent of firms are service rig contractors and about 5 percent are supply stores. Some 38 percent of firms provide other oilfield services which were generally specialty services such as perforating or fracturing. Most firms are quite specialized in the goods and services which they provide, as only 23 percent of the survey respondents indicated that their firm currently provides more than one service.

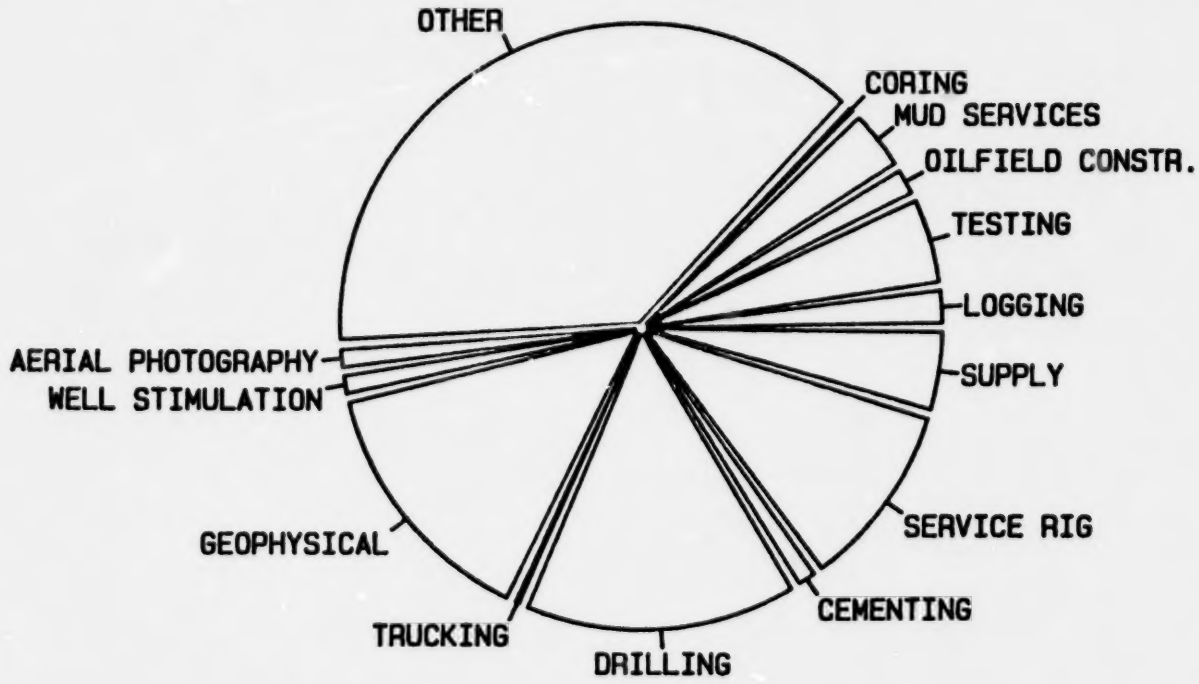
4.1.2 Total Revenue

In total, 94 percent of 1985 service and supply contractor revenue came from providing services to the oil and gas industry, indicating their high level of dependence on the industry. All of the various industry groups derived over 90 percent of their 1985 revenue from services to the oil and gas industry except for firms which were primarily involved in aerial photography and mapping services, supply store services, or coring contract services. Manufacturing accounted for a total of 3 percent of the survey respondents' 1985 revenue. The remaining 3 percent would be from other non-oilfield-related services.

Just as most of the operator capital expenditures are spent in Alberta, service and supply contractor revenue is largely earned in Alberta. On a weighted average basis, almost 76 percent of service and supply contractor 1985 revenue was from service activity in Alberta. This was down marginally from 1984. Most contractor groups reported percentages close to or higher than average. Only drilling rig and mud contractors reported percentages substantially below average; about 68 percent in both cases.

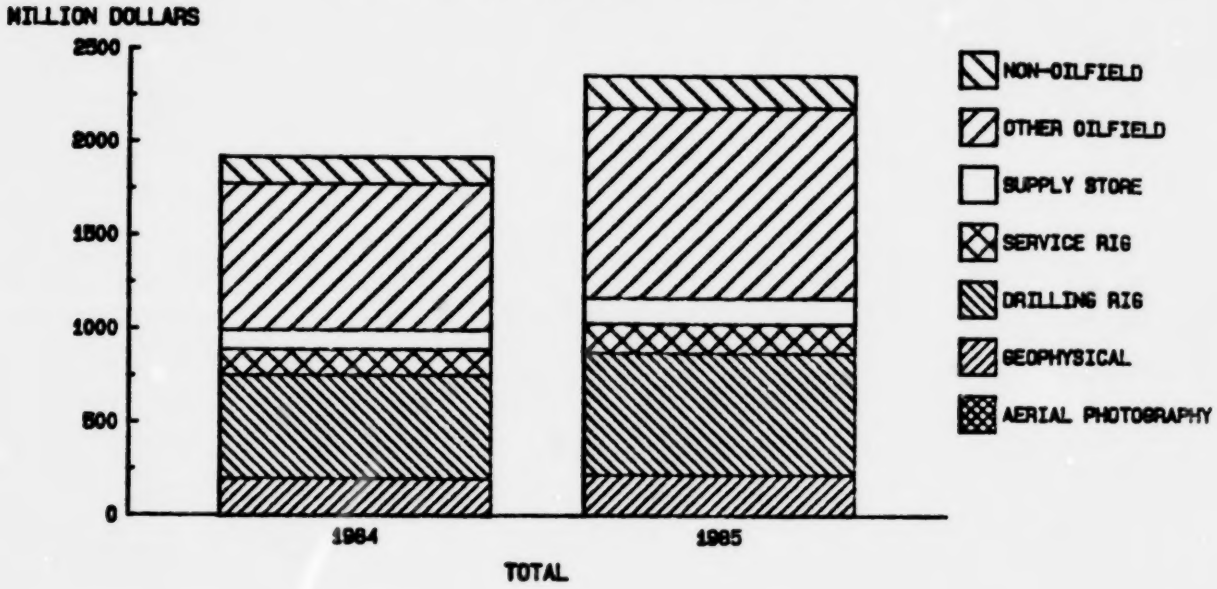
The respondents reported an increase in total revenue of 23 percent from 1984 to reach $2.4 billion in 1985. Drilling rig contract services accounted for about 28 percent of 1984 and 1985 revenue followed by 10 percent and 7 percent for geophysical contract and service rig contract services, respectively (see Figure 4.2). The sum of other drilling and oilfield services represented about 41 percent of

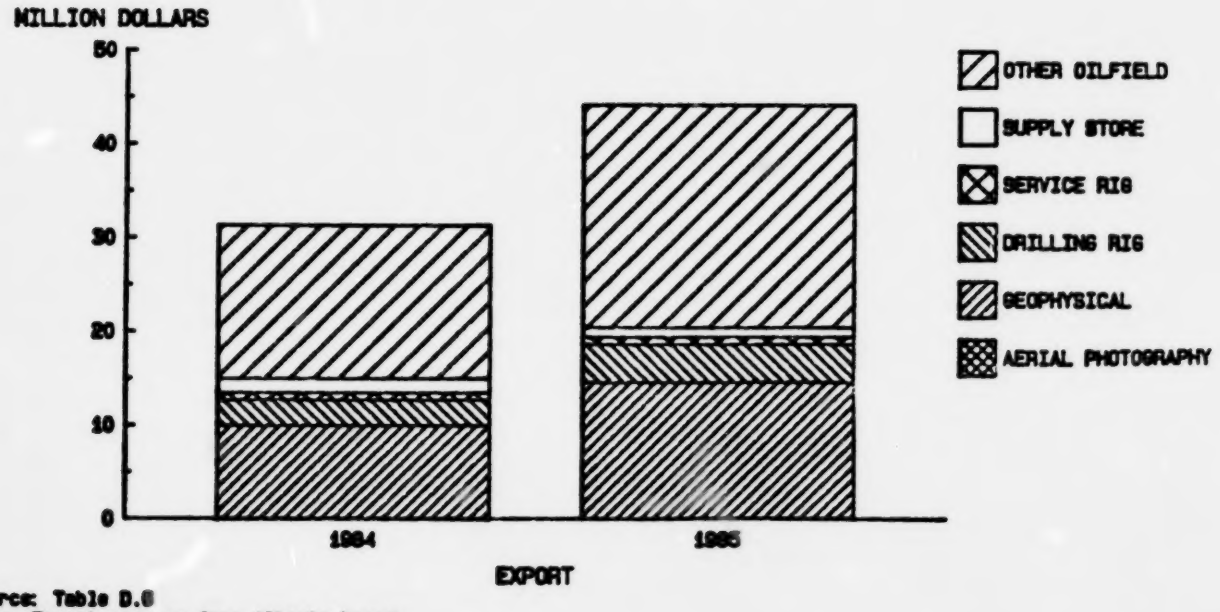
FIGURE 4.1
SERVICES PROVIDED BY SERVICE AND SUPPLY CONTRACTOR RESPONDENTS



Source: Table B.5
Note: Based on the major service provided by each firm.

FIGURE 4.2
SERVICE AND SUPPLY CONTRACTOR RESPONDENT REVENUE
BY TYPE OF SERVICE: 1984-1985





Source: Table D.8
Note: Export revenue from Alberta based operations only.

total revenue, most of which was accounted for by firms which primarily provide well stimulation or other specialized oil and gas field services.

The increase in revenue experienced in 1985 is expected to be followed by a dramatic decline of 42 percent in 1986. The service and supply contractor survey respondents anticipate that their total revenue will fall from $2.4 billion in 1985 to $1.4 billion in 1986 (see Figure 4.3). A further decrease of 3 percent is anticipated in 1987, bringing total revenue to $1.3 billion. Almost one half of the firms would not specify an expected percentage change in 1987 revenue.

4.1.3 Export Revenue

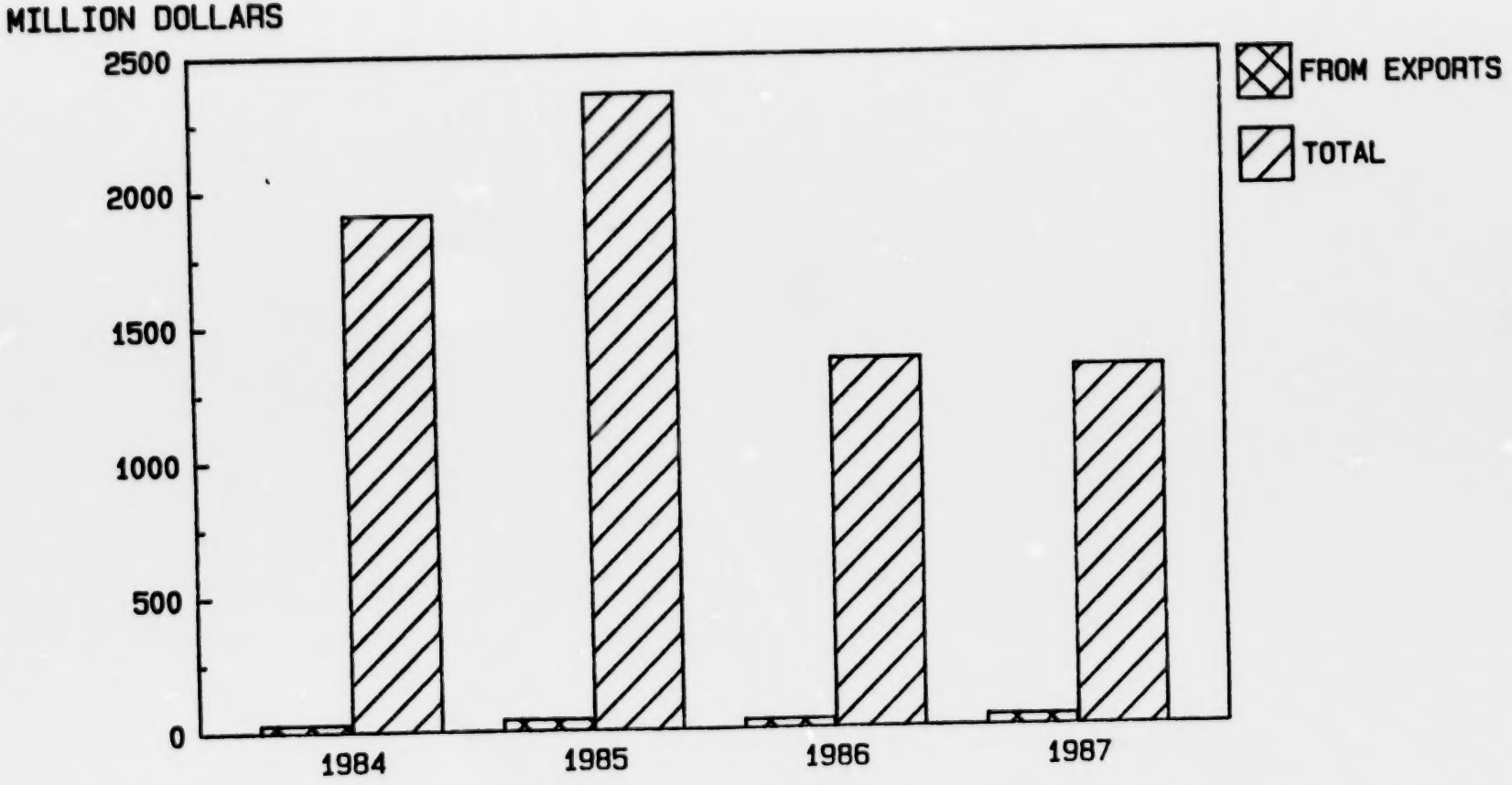
Export revenue showed even larger increase that total revenue in 1985, increasing 41 percent from the 1984 level of $31 million to reach $44 million in 1985. However, exports do not represent a significant portion of total revenue since only 18 percent of survey respondents exported oil or gas field services from their Alberta based operations in 1984 or 1985 and oil and gas field service export revenue accounted for less than 2 percent of total respondent revenue in 1985.

In contrast to total revenue, only 9 percent of revenue from exports of oil or gas field services was derived from drilling rig contract services. Much higher percentages came from geophysical contract services (32 percent) and other drilling and oilfield services (52 percent). As with total revenue, well stimulation contractors accounted for most of the latter.

Export market projections are relatively optimistic compared with the outlook for total revenue. Based on the expectations of firms which exported in 1984 or 1985, service and supply contractor export revenue is expected to decrease 24 percent from 1985 to reach about $34 million in 1986. However, a subsequent increase of 21 percent results in anticipated export revenue of $40 million in 1987.

Most of the service and supply contractors which exported their services in 1984 or 1985 plan to continue to export. In addition, almost 20 percent of the 230 firms which did not export in those years plan to export in 1986 or 1987. In particular, relatively large percentages of both geophysical and testing contractors plan to export in 1986 or 1987.

FIGURE 4.3
SERVICE AND SUPPLY CONTRACTOR RESPONDENT REVENUE
1984-1987



Source: Tables D.6 and D.7
Note: Export revenue from Alberta based operations only.

Export revenue projections vary widely among the different contractor groups. The geophysical and drilling rig contractors expect relatively large declines in 1986; the testing contractors plan to eliminate their export market involvement in 1986; and the supply stores all expect the same or significantly higher levels of both 1986 and 1987 export revenue. Only the geophysical contractors expect a further decline in 1987 export revenue. Almost 30 percent of all exporters would not specify their 1987 export revenue expectations.

4.1.4 Price and Market Expectations

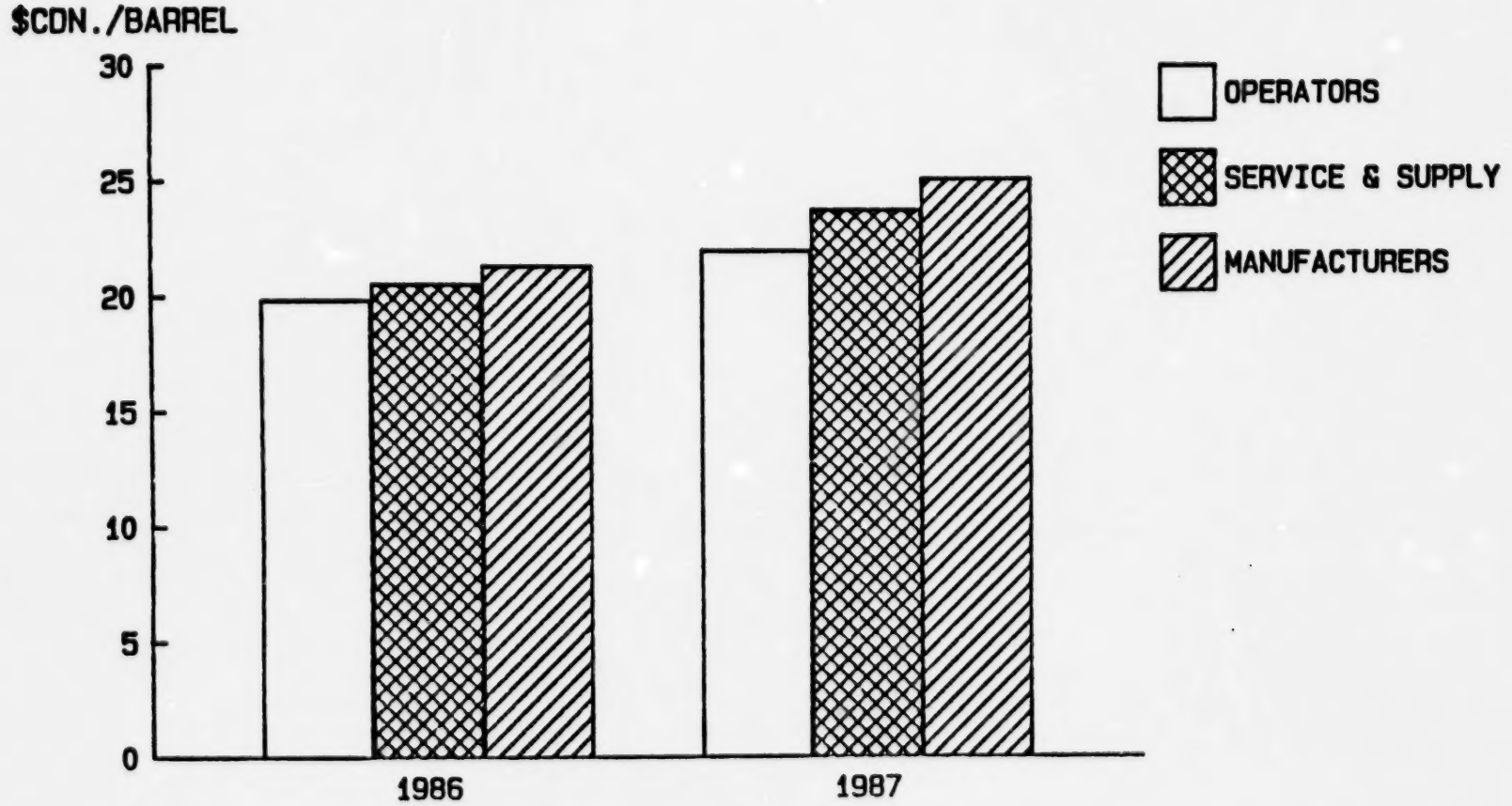
The service and supply contractors have relatively optimistic crude oil price expectations compared with the operators (see Figure 4.4). The anticipated average price of $20.54 (Cdn.) per barrel at Edmonton for the remainder of 1986 is expected to increase almost 16 percent to reach $23.77 (Cdn.) per barrel in 1987. However, considerable uncertainty still exists regarding crude oil prices as one-quarter of the respondents would not specify a 1986 price and 36 percent would not provide a 1987 price. Moreover, the crude oil prices reported ranged from a low of $12.68 (Cdn.) per barrel in both years to highs of $28 and $35 (Cdn.) per barrel in 1986 and 1987, respectively. These prices correspond to "typical" crude oil prices (West Texas Intermediate at Chicago) of $10, $21, and $26 (U.S.), respectively.

The potential impact of competition from imports is not apparent from the survey results. Only 17 percent of service and supply contractor respondents expect a change in the level of competition in their Canadian market from imports of oil or gas field services. Most of these expect increased competition which will have a significant or moderate impact on their operations. However, all but one firm expect their 1986 revenue to decrease even if they expect competition to decrease. Primarily geophysical, testing, and other specialized oilfield service contractors expect a change in competition with some firms in each group expecting increasing competition and some expecting decreasing competition.

4.2 Personal Interview Results

Personal interviews were conducted with 33 service and supply contractors. Included in this group were companies providing services related to exploration, development, and production. The interviews involved qualitative discussions of the current market situation in terms of demand, supply, and price for each type of service. In

FIGURE 4.4
CRUDE OIL PRICE FORECASTS BY INDUSTRY GROUP



Source: Table D.1
Note: Crude oil prices at Edmonton.

addition, the contractors were asked to explain how they have reacted to recent changes in their market situations. Variations in operating and capital expenditures as well as plans to diversify were discussed. Finally, the contractors were invited to make any other comments which were thought to be relevant.

Section 4.2.1 below summarizes the contractors' responses to questions related to the current market situation. In Section 4.2.2, reactions to the effects of lower oil prices are described while Section 4.2.3 reports on other comments made.

4.2.1 Current Market Situation

The service and supply contractors were asked to describe the demand, supply, and price for the services they provide and to compare current levels to those of last year. In terms of demand, all companies reported that current activity levels are significantly lower than they were at the same time last year. Contractors involved in exploration appear to have experienced the most dramatic reductions, with the majority reporting that the current volume of business is down roughly 75 percent from last year. Exploration-related activities include geophysical testing as well as some coring, logging, and chemical laboratory services. These contractors expect the demand for their types of services to be near zero for the remainder of this year and, in general, there is little optimism for 1987. For contractors not involved in exploration, demand is 50 to 75 percent lower than last year. Drilling and service rig contractors have been severely affected as the active rig count has fallen to approximately 15 percent of total available rigs. Contractors involved in completions have been slightly better off only because their activity levels lag behind those of the drilling industry. For the future, most contractors involved in drilling or oilfield services see only a slight possibility for improvement by the end of 1987. All service and supply contractors stated that the price of oil will be the most important factor involved in determining the demand for their services between now and the end of 1987.

In general, the contractors are not expecting a significant increase in demand from export markets. While many companies are planning to pursue export markets more aggressively, it is expected that competition will increase proportionately.

Existing and potential export markets for the companies interviewed include the U.S., the Middle East, China, Pakistan, Bolivia, and Burma. Canadian subsidiaries or branches of multinational companies typically do not export and this is not expected to change in the near future. Other companies which do not currently export generally have only vague plans to do so in the future.

The firms were asked to evaluate government policies which are designed to assist export development, and to make recommendations for changes or additions to those policies. While most companies feel that the assistance of the Canadian International Development Agency (CIDA) and the World Bank are good, they think that CIDA programs could be improved. There is a feeling that CIDA's programs are cumbersome and difficult to use, and that it is often not easy to contact the correct people within CIDA. Most contractors suggested that governments should play a diplomatic role in negotiations with other countries, particularly when a foreign government is involved. Virtually all of the firms interviewed mentioned the positive contribution of the former Alberta Minister of International Trade in this regard. One firm felt that governments could do more to provide information about foreign markets. This would include facts about the way business is conducted in particular countries as well as suggestions for new export opportunities.

The contractors were also asked to discuss the capacity or supply situation within their own company and within the industry. Their responses indicate that there is substantial surplus capacity in all aspects of the service and supply industry.

Geophysical firms estimate that roughly 13 percent of available seismic crews are now at work. While the summer is not ever a busy time of year, the current level of utilization is significantly below normal and, furthermore, there is little hope for improvement this winter. For companies involved in drilling, the situation is only marginally better. Almost 15 percent of the 570 existing rigs are working and the current contingent of downhole equipment is said to be twice as large as necessary. All of those involved in drilling feel that the industry is substantially overbuilt with far too many rigs and an overabundance of equipment, even for a healthy and active market.

Most service and supply contractors expect a decrease in the number of companies in the industry in the remainder of 1986. In the geophysical sector, it is felt that many small companies will go

bankrupt while multinationals will probably survive. Drilling rig contractors foresee a large number of closures and bank-induced mergers, and, for almost all other services, the situation is similar. The only exception is in the consulting sector since layoffs in the rest of the oil industry are resulting in an increased supply of consultants.

Bankruptcies might be welcomed as a means of rationalizing capacity, but do not necessarily result in a reduction in capacity. When companies go bankrupt, their equipment does not typically disappear from the marketplace. This is cited as a potentially serious problem for firms which do not go out of business but which may be forced to compete with companies which have purchased their equipment at greatly reduced prices.[1]

Prices for services are significantly lower than they were in 1985. The magnitude of the change differs widely among the various types of service as well as among companies offering similar services. Of the six geophysical contractors who were interviewed, two reported that prices are now approximately 40 to 50 percent lower than last year, three said that prices are 10 to 15 percent lower, and one merely stated that companies are now operating at or below cost. It is difficult to determine why this range of responses exists as the companies did not differ greatly in their discussion of issues relating to demand or supply. The geophysical firms were unanimous in saying that profits are zero at best, with some work being done below cost. Prices in this sector were reported to respond very rapidly to increases or decreases in activity but no one foresees any significant strengthening in the next year.

Eight drilling and service rig contractors were interviewed and, once again, there was a wide divergence in opinion about current market prices. Four firms felt that the price decline since last year is in the 5 to 20 percent range, two suggested it is 45 to 50 percent, and two responded that prices haven't changed. One of these last two appeared to contradict this statement at other times in the interview and the other contractor stated that he has made no profits in four years. None of the eight contractors expects prices to strengthen in

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[1]This same problem was noted in an earlier study of the service and supply industry. See Canadian Energy Research Institute, "A Sector Profile of the Conventional Oilfield Services Industry in Western Canada."

the near term and all of them state that prices are currently so low that there is no profit being made. Many jobs are, in fact, being completed at prices which do not cover costs. Prices in the drilling industry tend to fall rapidly as activity drops off and to recover more slowly when markets improve.

The other firms which were interviewed stated that there are no profits currently being made and many companies are not even covering costs. Prices are not expected to improve in the near future although prices typically respond rapidly to changes in activity. Companies renting or selling equipment generally reported that prices are 30 to 50 percent lower than in 1985. Those involved in well stimulation and cementing, wireline, fishing tool, and corrosion control services tended to feel that prices are down roughly 25 percent. Finally, prices for testing and logging are down generally in the 40 to 60 percent range.

4.2.2 Reaction to the Current Market Situation

All of the service and supply contractors interviewed have undertaken dramatic cost-cutting measures in attempts to remain viable. There is no company which has not carefully considered and implemented major expenditure reductions. The most significant changes have been related to employment and are discussed in detail in Chapter 6. Other measures include the reduction of operating and capital expenditures to the lowest possible levels. Companies have restricted entertainment and travel costs, reduced office space wherever possible, begun doing their own janitorial work, and generally eliminated all spending which is deemed to be "non-essential." Capital spending has virtually been eliminated and only necessary maintenance work is being done. Many firms are using parts from idle equipment to repair machinery which is still in use. There is a concern among the contractors that the industry will not be prepared to meet demand if market conditions improve.

The service and supply contractors do not see diversification as an answer to problems within their industry. Most firms are highly specialized with equipment designed for particular applications and with skilled people who are trained for certain jobs. Only four companies are seriously examining diversification and none of these expects their plans to generate a significant amount of revenue.

Another four firms have cancelled previous diversification plans because of their poor financial positions.

The contractors were asked whether they considered their cost cutting and diversification measures to be temporary or permanent. Most felt that luxury items will likely not be reincorporated but that other operating and capital expenditures would have to increase if market demand increased. Some contractors stated that they wish to leave the industry and are merely waiting for market conditions to improve in order to sell their companies or assets.

4.2.3 Other Comments

At the end of each interview, the service and supply contractors were invited to comment on anything which they felt was relevant and which had not been discussed during the interview. Most of them chose to make policy recommendations and to discuss the role of governments in regulating and assisting the oil industry. The most common statement was that the oil industry should be treated just like other industries. Taxes such as the Petroleum and Gas Revenue Tax (PGRT) as well as onerous royalties were said to be unfair. Short-term incentives were criticized as "band aid" solutions and it was suggested that governments should develop some long-term framework for regulating Canada's oil industry.

Many of those interviewed discussed the fact that low oil prices are a worldwide problem and it was suggested that governments could, perhaps, do little to improve conditions in Canada. It was often mentioned, however, that the governments wrongly intervened when prices were high and that there should be some compensation made for that intervention. Finally, it was said that it is dangerous to let "our" industry decline. Security of supply continues to be an issue. It is generally felt that some stability in oil markets would greatly enhance the industry's ability to operate.

4.3 Summary and Conclusions

Some 70 to 95 percent of operator capital expenditures, excluding land expenditures, amount to service and supply contractor revenue.[2] Since 94 percent of the 1985 revenue of the service and

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[2]Based on a limited survey of operators of various sizes, August 1986.

supply contractor respondents was obtained from the operators, the decline in operator capital expenditures will dramatically impact this sector. This section discusses industry results derived from the respondents' data outlined in the chapter (see Section B.4.2 regarding the expansion procedure used) and provides observations on these results.

The impact is already evident in the current market situation. The level of demand for oil and gas field services is 50 to 80 percent below 1985 levels. The geophysical contractors appear to be the most severely affected, with current demand levels down 75 percent from 1985 demand and only about 13 percent of available seismic crews active. Other drilling and service firms are only somewhat better off with demand levels estimated to be down 50 to 75 percent from year ago levels.

Despite disagreement regarding the extent of price declines, the firms interviewed agreed that they are operating at a loss. The rationale provided for operating below cost was the need to maintain some cash flow, primarily due to debt servicing requirements. The implication is that firms are willing to operate at a loss in the short-term in order to stay in business and maintain market share.

All sectors indicated that substantial excess capacity exists in the industry. In particular, the current contingent of downhole drilling equipment is considered to be twice as large as would be required for even a healthy industry. Although many bankruptcies are expected, the excess capacity situation is not expected to improve. Equipment sold from bankrupt firms is typically purchased and re-introduced into the market to compete against firms which paid full price for their equipment. Similarly, laid-off employees often set up consulting operations which compete against their former employers. These same concerns were expressed by the industry in personal interviews with the consultants in 1983.[3]

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[3]Canadian Energy Research Institute, "A Sector Profile of the Conventional Oilfield Services Industry in Western Canada."

The above problem is reinforced by the specialized nature of both the equipment and the firms in the industry. Although a few firms are considering diversification, the move is not expected to significantly improve their revenue situation. Of the telephone survey respondents, only 23 percent currently provide more than one service to the oil and gas industry, further emphasizing their dependence on the industry.

Although revenue from exports of oil and gas field services increased 41 percent in 1985 over 1984, and export revenue projections for 1986 and 1987 are more favorable than for total revenue, export markets are not generally viewed as an alternative to the depressed domestic situation. The service and supply contractors are aware that the downturn in the oil and gas industry is a worldwide phenomenon such that competition is expected to increase in what are perceived to be lucrative export markets. Moreover, many export contracts are only one-time or short-term prospects as foreign countries develop their own expertise. Finally, although some 20 percent of the 230 firms which did not export in 1984 or 1985 plan to do so in the next 2 years, few of these firms had concrete plans established for their move into export markets.

In domestic markets, a change in the level of competition from imports is expected by some firms. It is not clear whether or not this is a significant factor since only 17 percent of firms expect a change, although most expect an increase in competition which will have a significant or moderate impact on their operations. However, virtually all of these firms expect a decrease in their 1986 revenue from 1985 levels, even if they expect import competition to decrease.

No improvement in demand or prices is expected in domestic markets until at least 1987. Total estimated industry revenue is expected to fall 42 percent from $3,543 million in 1985 to only $2,056 million in 1986.[4] A further decline is anticipated in 1987, with total expected revenue of $2,003 million (see Figure 4.5).

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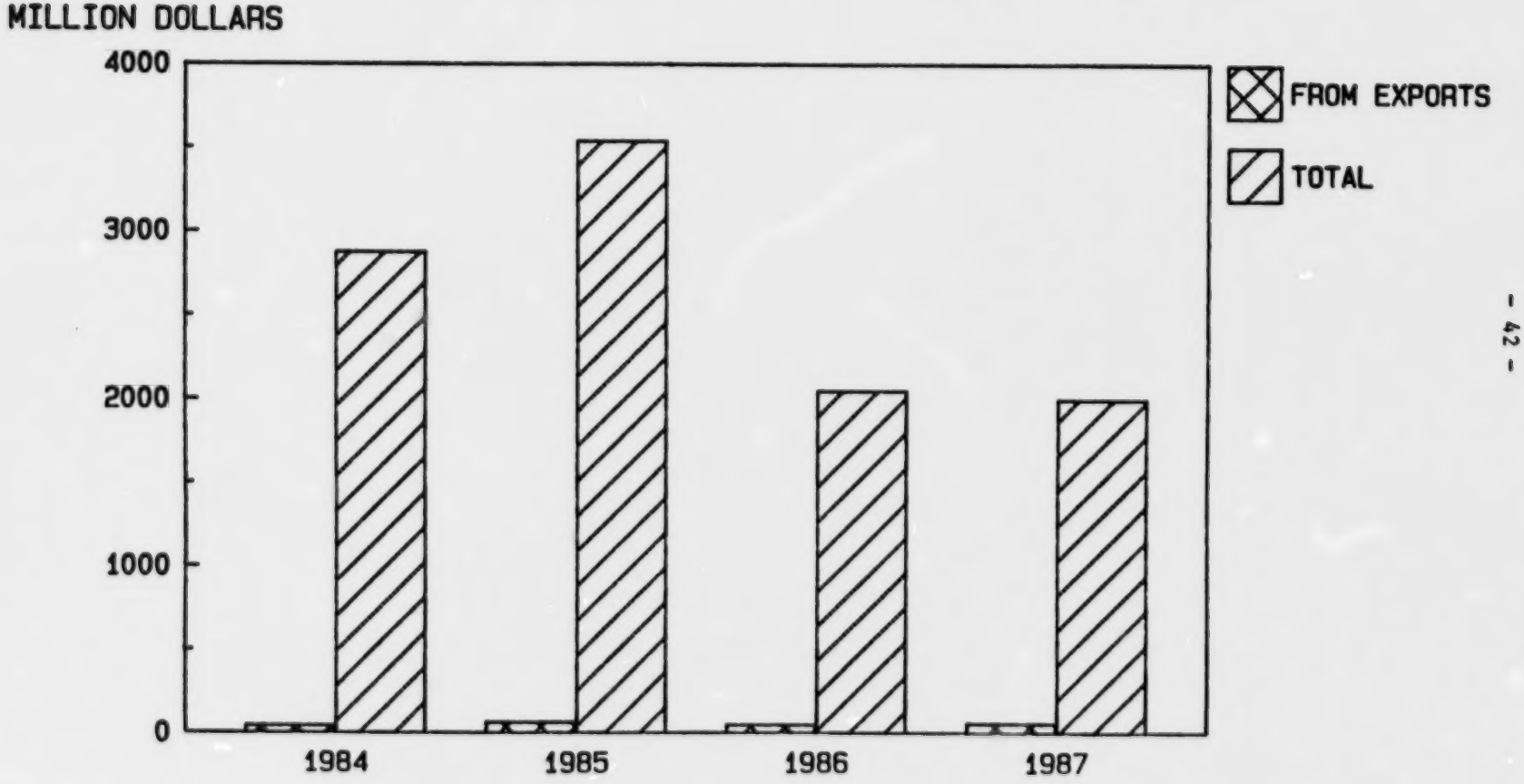
[4]This does not include an estimated $81 million in revenue from services provided by oil and gas field equipment manufacturers. See section 5.1.2.

FIGURE 4.5
SERVICE AND SUPPLY CONTRACTOR
TOTAL INDUSTRY REVENUE: 1984-1987



Source: Tables D.9
Note: Export revenue from Alberta based operations only.

In reaction to this situation, operating costs have been cut wherever possible. No capital expenditure projects are being undertaken and only necessary maintenance work is being done. In some cases, parts from idle equipment are being "pirated" to service operational equipment. A major concern of the service and supply contractors is that the level of operable equipment is far below the level of existing equipment and insufficient to meet demand if demand suddenly increased. However, this same concern was expressed in the industry interviews undertaken in 1983 and subsequently proved to be unfounded when demand picked up again.

Crude oil prices are generally considered to be the most important factor affecting demand. In light of this, it is surpising that one-quarter of the respondents would not specify a 1986 price for crude oil and 36 percent would not provide a 1987 price. It is not clear whether these firms actually did not know what level of crude oil prices to expect or whether they had price expectations which, if realized, would indicate the demise of their firm. Nevertheless, it is obvious that a significant proportion of service and supply contractors are operating without a clear feeling for the principal variable affecting their business environment.

Despite the fact that the service and supply contractors expect higher 1986 and 1987 crude oil prices than the operators, they expect much greater reductions in revenue than the projected declines in operator capital expenditures. The ratio of total operator capital expenditures to total service and supply contractor revenue increases significantly in 1986 over 1984 and 1985 levels and returns to near-normal levels in 1987. Since contractor revenue is based on operator expenditures, it would appear that the 1986 revenue projections of the contractors are pessimistic given the projected capital expenditures.

Notwithstanding the possibility that service and supply contractor 1986 revenue may be higher than they expect it to be, it is clear that this industry sector is facing a grave situation. A drilling rig utilization rate of 55 percent is required for drilling and service rig contractors to meet cash costs, and a utilization rate of about 60 percent is necessary for marginal profitability for medium depths rigs only.[5] Based on an expected utilization rate of less

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[5]Oilweek, July 22, 1985, p. 40.

than 45 percent for 1986[6] and a July 1986 utilization rate of only 15 percent,[7] the industry is not generally expected to be profitable in 1986. Although the extent of possible bankruptcies cannot be forecast, it is noteworthy that 6 of the 25 service and supply contractors who provided comments during their telephone inteviews indicated that they could be out of business in the near future. Considerable uncertainty still exists, however, as half of the firms would not provide an estimate of their expected 1987 revenue.

Even in the face of this situation, all firms which commented on the government's role in the industry are adamantly opposed to intervention in the form of short-term incentives as only a "band aid" solution. Since the price of crude oil is generally considered to be the most important factor affecting demand for oil and gas field services, and security of supply and the long-term viability of the Canadian oil industry are recognized as important, several firms raised the suggestion of a floor price for crude oil.

Other than possibly easier access to existing government export assistance programs, the service and supply contractors preferred to see any government intervention limited to that arena. Increasing the cash flow of operators through higher crude oil prices and/or lower royalties and taxes was perceived by the contractors to be the best way to improve the health of their sector.

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[6]Personal contact, Canadian Association of Oilwell Drilling Contractors, August 1986.
[7]Oilweek, July 14, 1986, p. 2.

Chapter 5

THE IMPACT ON OIL AND GAS FIELD EQUIPMENT MANUFACTURERS

Manufacturers of oil and gas field equipment have experienced dramatic reductions in revenue as a result of lower oil prices. The industry's 1986 revenue is expected to be 35 percent lower than it was in 1985. Prices are down from 10 to 30 percent for most manufactured goods and demand has dropped to almost zero for a number of products. All plants are running well below capacity while manufacturers are attempting to sell off an oversupply of inventories.

The market situation has forced most manufacturers to reduce employment levels. Companies have cancelled all plans for capital expenditures and are making only necessary repairs to equipment. The viability of small companies is coming into question and, if conditions do not improve, a number of manufacturers will likely go bankrupt.

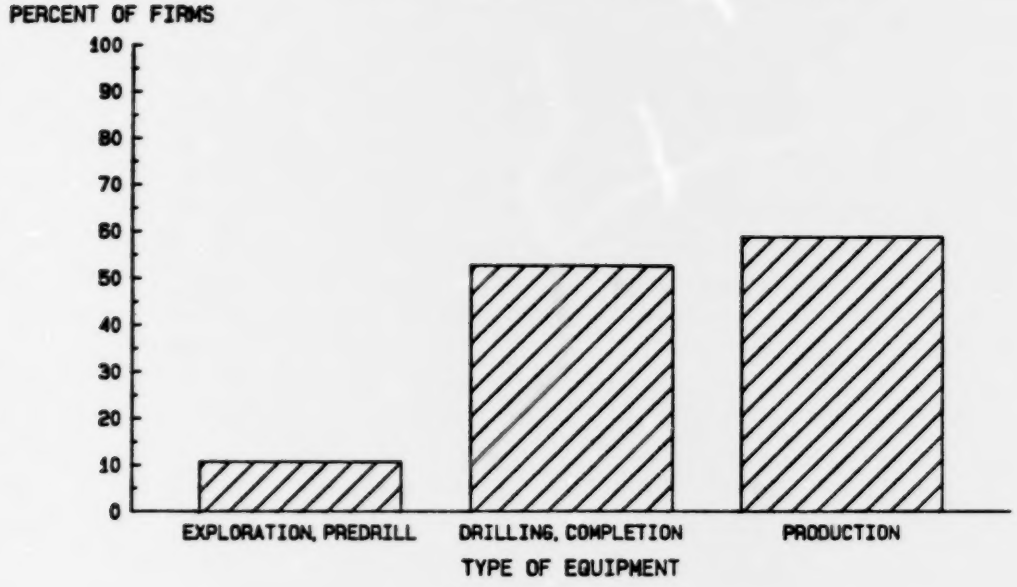
In this chapter, the effects of lower oil prices on manufacturers are discussed in detail. Telephone and personal interviews are examined separately in the first two sections, and editorial comment on all information is provided in a summary at the end of the chapter.

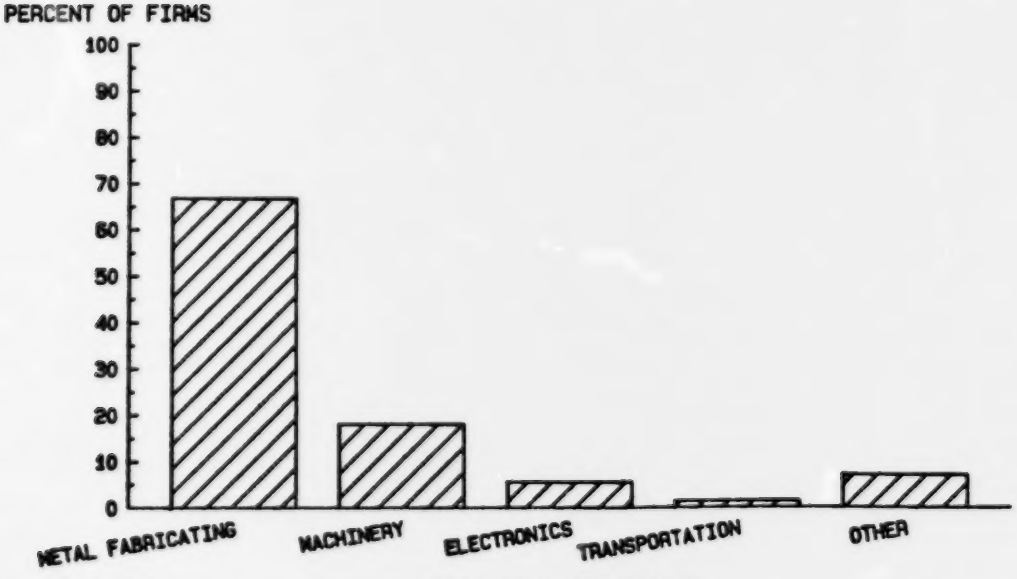
5.1 Telephone Interview Results

5.1.1 Type of Equipment

Three major types of equipment are involved in oil and gas industry-related activities: exploration or predrill equipment; drilling, completion, or well service equipment; and production equipment (see Figure 5.1). Exploration and predrill equipment is employed in seismic work, surveying, and other activities which occur before drilling and includes such items as seismic drills and cables, all-terrain/amphibious/offroad vehicles, satellite survey receivers, and portable laboratories. Drilling, completion, and well service equipment is involved in the actual drilling and servicing of wells to bring them to the production stage and includes drilling rigs, well logging equipment, logging blowout preventers (BOPs), and drilling mud pumps.

FIGURE 5.1
DISTRIBUTION OF MANUFACTURERS BY TYPE OF EQUIPMENT AND TYPE OF MANUFACTURING





Source: Table B.6
Note: Firms indicated one major type of manufacturing only.

Production equipment is employed at the wellsite or in the field to facilitate hydrocarbon production. Heaters, separators, dehydrators, treaters, and pump jacks are all examples of production equipment.

The 191 survey respondents represent manufacturers of the three major types of oil and gas field equipment. Each firm indicated all the types of equipment they manufacture. Almost 60 percent of the respondents manufacture production equipment, 53 percent manufacture drilling, completion, or well service equipment, and only 11 percent manufacture exploration or predrill equipment. Each firm also indicated the one major type of manufacturing they are involved in; metal fabricating, machinery, transportation equipment, electronics, or "other." The majority of firms (67 percent) are metal fabricators. Some 18 percent of firms are engaged in machinery manufacturing while less than 2 percent manufacture transportation equipment. Firms within each of the manufacturing types indicated the same overall concentration on production equipment and drilling, completion, or well service equipment. Electronics manufacturers are the only exception to this, with 73 percent of those firms manufacturing production equipment and 27 percent manufacturing each of exploration or predrill equipment and drilling, completion, or well service equipment.

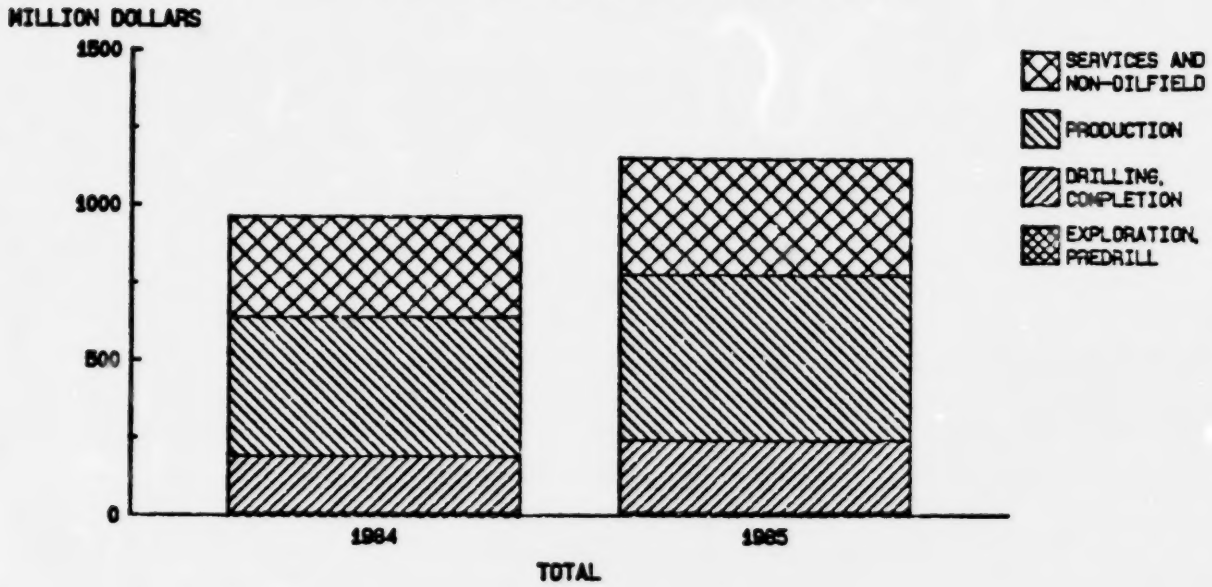
It should be noted that the discussion in this section pertaining to the different manufacturer groups is based on the survey respondents only. However, since most of the industry was covered in the survey, the results should be indicative of the relevant manufacturer groups.

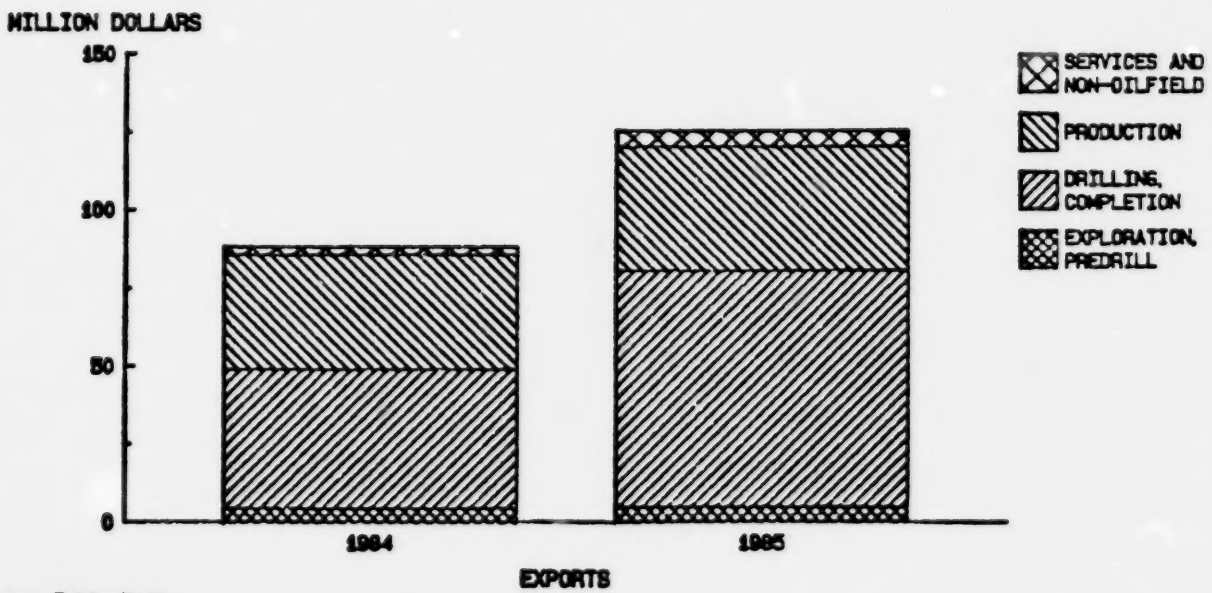
5.1.2 Total Revenue

On average, 88 percent of 1985 oil and gas field equipment manufacturer revenue came from their total manufacturing operations. Of the remaining 12 percent, 7 percent was derived from providing services to the oil and gas industry. The residual of 5 percent would represent non-oilfield-related revenue. Only two-thirds of total 1985 revenue came from oil and gas field equipment manufacturing (see Figure 5.2), indicating that the oil and gas field equipment manufacturers are somewhat less dependent on the industry than the service and supply contractors.

As with the service and supply contractors, most of the manufacturers' revenue is obtained in Alberta. Some 67 percent of

FIGURE 5.2
OIL AND GAS FIELD EQUIPMENT MANUFACTURER REVENUE
BY TYPE OF EQUIPMENT: 1984-1985





Source: Table D.10
Note: Revenue from Alberta based operations only.

total oil and gas field equipment manufacturer 1984 revenue came from their Alberta based operations. This percentage increased to 69 in 1985. Metal fabricators derived slightly lower percentages of their 1984 and 1985 revenue from their Alberta based operations, while the percentages for the other groups are significantly higher; about 85 percent for machinery manufacturers, approximately 80 percent for electronics manufacturers, about 95 percent for "other" oilfield equipment manufacturers, and 100 percent for the three transportation equipment manufacturers which responded. Total revenue from the Alberta based operations of oil and gas field equipment manufacturers increased 20 percent from $962 million in 1984 to $1,152 million in 1985 (see Figure 5.2).[1]

The concentration on drilling and production equipment noted above in the percentage of firms which manufacture this type of equipment is also evident in the historical distribution of revenue by type of equipment. Over 45 percent of manufacturer revenue from their Alberta based operations in both 1984 and 1985 was from production equipment while 20 percent was from drilling, completion, or well service equipment (see Figure 5.2). Only one percent was obtained from exploration or predrill equipment with the remainder derived from either oilfield services or non-oilfield related equipment or services.

On a percentage basis, the manufacturers expect their revenue to be affected by the decline in crude oil prices to a lesser extent than that of the service and supply contractors. The oil and gas field equipment manufacturers anticipate a 35 percent decrease in their 1986 revenue from their Alberta based operations over 1985 (see Figure 5.3). An 8 percent increase is expected in 1987, resulting in $806 million in revenue from their Alberta based operations in that year. Despite this increase, the expected 1987 revenue is still 16 percent less than that in 1984. However, it must be noted that some 40 percent of respondents would not speculate the change in their revenue between 1986 and 1987.

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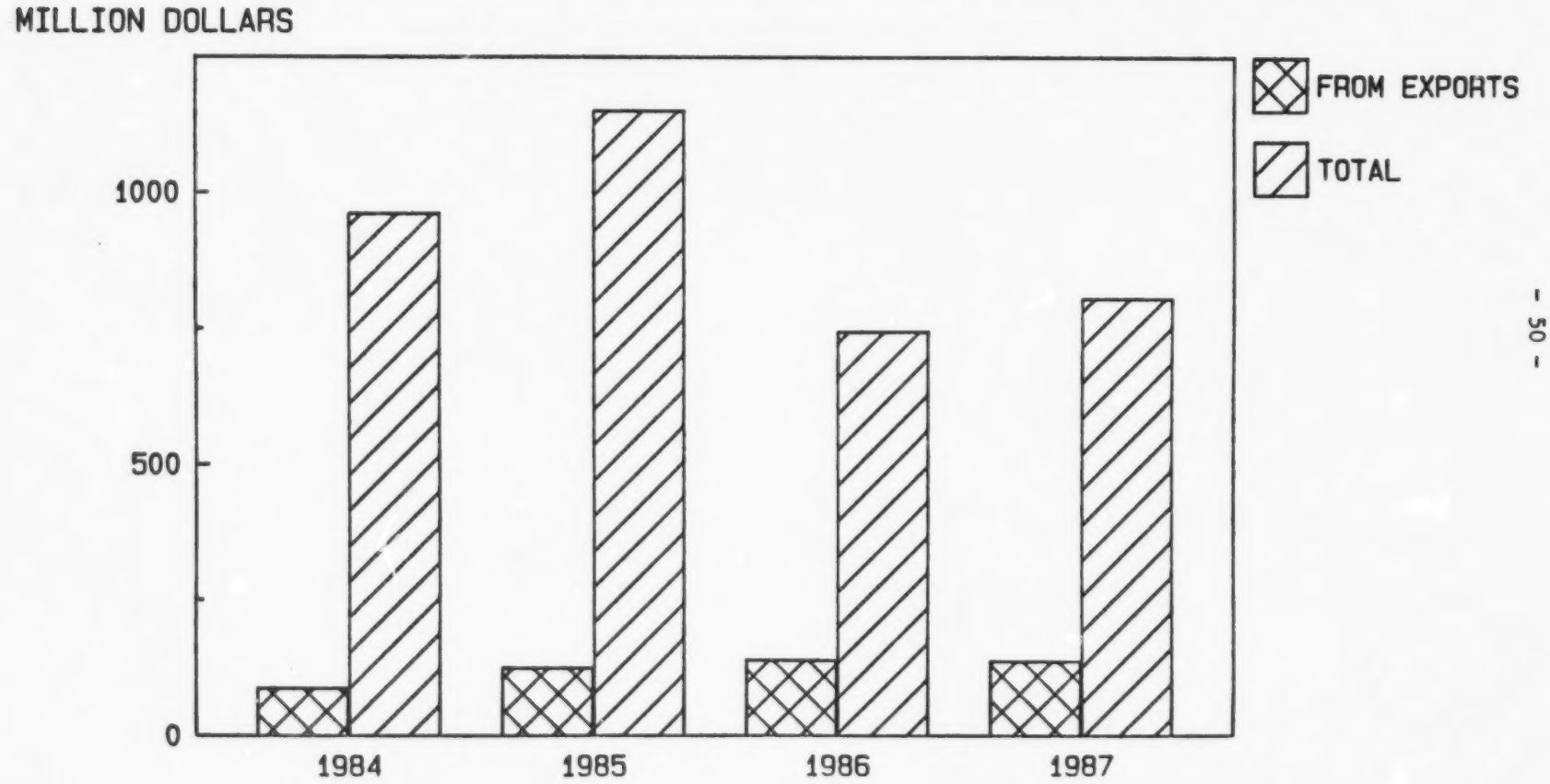
[1]This does not include an estimated $106 million in revenue from the manufacturing operations of oil and gas field service and supply contractors. See sections 4.1.2 and 4.3.

FIGURE 5.3
OIL AND GAS FIELD EQUIPMENT MANUFACTURER
REVENUE FROM ALBERTA BASED OPERATIONS: 1984-1987



Source: Tables D.10 and D.11

5.1.3 Export Revenue

Manufacturer revenue from exporting oil and gas field equipment from their Alberta based operations increased over 40 percent from the 1984 level of $88 million to reach $126 million in 1985. However, exports are not a major source of revenue as they accounted for only about 10 percent of 1984 and 1985 total revenue, despite the fact that over 40 percent of the manufacturers exported in those year.

The 1984 and 1985 distribution of manufacturer revenue from the export of oil or gas field equipment displays the same concentration on drilling and production equipment as total revenue. However, a greater percentage of export revenue is derived from drilling, completion, or well service equipment.

The manufacturers' expectations regarding export markets are relatively optimistic compared with those for total revenue. Most of the manufacturers which exported oil or gas field equipment in 1984 or 1985 plan to continue to export. In addition, almost 30 percent of firms which did not export in those years plan to export in 1986 or 1987. Based on the projections of firms which exported in 1984 or 1985, export revenue is expected to increase in 1986, although at a slower rate than the 1985 increase. Manufacturer revenue from exporting oil and gas field equipment from their Alberta based operations is expected to increase 12 percent in 1986. A small decrease of less than 2 percent in 1987 results in anticipated export revenue of $138 million in that year. Over one-quarter of the exporters would not estimate the expected change in export revenue between 1986 and 1987.

Export market projections vary widely among the various types of manufacturers. The metal fabricators which exported in 1984 or 1985 obtained a larger percentage of their revenue from exports than did the total industry. They expect a larger than average increase in 1986 export revenue and a small increase in 1987. A higher than average proportion of machinery manufacturers exported oil or gas field equipment in 1984 or 1985 with a much greater concentration of drilling, completion, or well service equipment. They expect a net decrease in export revenue in 1986 but an increase in 1987. The same is true for the electronics manufacturers with a greater concentration on exploration or predrill equipment. None of the transportation equipment manufacturers exported oil or gas field equipment in 1984 or 1985 and only one plans to export in 1986 or 1987.

5.1.4 Price and Market Expectations

Of the three industry groups, the manufacturers have the most optimistic crude oil price expectations. The projected average price of $21.33 (Cdn.) per barrel at Edmonton for the remainder of 1986 increases almost 18 percent to reach $25.11 (Cdn.) per barrel in 1987 (see Figure 4.4). However, these projections are shrouded in uncertainty as 30 percent of the manufacturers would not specify an average price for the remainder of 1986 and 45 percent would not specify a 1987 price. In addition, those manufacturers which responded reported a broad range of prices; $12.68 to $33.81 (Cdn.) per barrel in 1986 and $12.68 to $40.85 (Cdn.) per barrel in 1987. These correspond to typical crude oil prices (West Texas Intermediate at Chicago) of $10 (U.S.) per barrel on the low end and $25 and $30 (U.S.) per barrel on the high end for 1986 and 1987, respectively.

The transportation equipment manufacturers have the highest expected crude oil prices of about $25 and $30 (Cdn.) per barrel in 1986 and 1987, respectively. The electronics equipment manufacturers expect lower than average prices while all the other groups generally follow the average.

Only 30 percent of the manufacturers expect a change in the level of competition in their Canadian market from imports (see Table D.11). Most of the firms which do expect a change expect increased competition that will have a significant or moderate effect on their operations. All of the manufacturing groups follow this general pattern although the extent of the impact is expected to be less than average for the trucking, electronics, and other oilfield equipment manufacturers.

It is not clear whether or not the expected change in competition from imports is a significant factor affecting the manufacturers' revenue. Almost all firms which anticipate an increase in competition from imports in their domestic market that will affect their operations also expect a decrease in their 1986 revenue over 1985. However, virtually all firms which expect a decrease in the level of competition from imports also project a decline in, or at best a maintenance of, their level of revenue.

5.2 Personal Interview Results

Personal interviews were conducted with 33 manufacturers. This group included metal fabricators as well as manufacturers of machinery, transportation equipment, and electronic instruments. These companies are manufacturers of goods for all aspects of the oil industry including exploration, predrill, drilling, completion, well servicing, and production.

The manufacturers, like the service and supply contractors, were asked to assess the current market situation in terms of demand, supply, and price for the goods which they manufacture. In addition, a summary of each company's reactions to the current situation was requested and the manufacturers were encouraged to make any comments which were felt to be relevant but which had not been included in the questionnaire. Section 5.2.1. below summarizes the current situation while 5.2.2 discusses reactions to the situation. In section 5.2.3, other comments made by the respondents are detailed.

5.2.1. Current Market Situation

The manufacturers were asked to compare the current demand for their products to the demand at this time last year. For all types of equipment, significant reductions in the volume of business were reported. Companies involved in the production of exploration and predrill equipment have experienced a decline of over 70 percent and they do not foresee any improvement in the near future. Manufacturers of drilling, completion, and well service equipment reported that demand is currently between 75 and 98 percent lower than it was last year. Total demand for this equipment is consistent with the active rig count although different manufacturers have experienced different decreases in demand as a function of each firm's competitiveness with other manufacturing firms. For the rest of 1986, the manufacturers of drilling equipment are generally united in the belief that the market cannot deteriorate much more. Almost none of the manufacturers would give any forecast of market conditions in 1987.

Manufacturers of production related equipment have experienced a wide range of decreases in demand. For manufacturers of gas plant equipment, demand has fallen roughly 25 percent while most pump jack manufacturers have seen demand decrease by more than 80 percent. Those involved in the manufacture of pressure vessels have had demand for their products cut in half and downhole equipment manufacturers are

selling 98 percent less equipment now than they were last year. The demand for most electronic equipment has fallen 60 percent with the exception of the demand for one company's newly designed product. This product is related to maintenance of equipment and is a cost-saving device.

Twenty of the firms interviewed have exported goods within the last two years and most of these hope to continue to export in the future. While a number of these firms are hoping to offset declining domestic sales with growth in export markets, most manufacturers expect increased competition and low oil prices to limit foreign sales. In addition, there is a concern that many foreign markets are not good long-term prospects because of the fact that a large number of countries are attempting to develop technology internally. Equipment sales may be one-time occurrences. Geographically, the markets viewed as providing the best opportunities in the next few years are the Soviet Union, China, South America, Australia, New Zealand, India, Pakistan, Indonesia, Europe, and the United States.

In general, government assistance to exporters is viewed favourably by manufacturing firms. Both the Canadian International Development Agency (CIDA) and the Program for Export Market Development (PEMD) offered through the Department of Regional Industrial Expansion (DRIE), were said to be helpful. In addition, Canadian embassies were praised as was Canada's international reputation. It should be noted as well that the former Alberta Minister of International Trade was often praised for his work in developing export markets.

The manufacturers had a number of suggestions as to how government assistance to exporters could be improved. These suggestions related primarily to CIDA programs with only a few concrete recommendations for new types of assistance. It was suggested that CIDA assistance is too slow with too much paperwork involved in applications. The manufacturers complain that applications are not processed rapidly enough and that it is too difficult to contact people within CIDA. In addition, it was said that CIDA should provide information to companies which are not awarded contracts so that they are aware of why they have not be chosen. There is also a concern that Canadian content guidelines are not always adhered to, with foreign equipment sometimes being misrepresented as Canadian. Finally, companies feel that CIDA is not always up to date in its knowledge of what types of equipment are offered by various companies. This results in the exclusion of some companies from bid lists. Suggestions for

additional government assistance other than that offered through CIDA include credit risk insurance, reduced freight rates, and funding for market research.

The 13 companies interviewed which do not currently export goods are unlikely to do so in the future. This is generally because they are subsidiaries of foreign firms or because the equipment which they manufacture is large or heavy and is, therefore, expensive to move.

Most manufacturers foresee little change in the market share of imports into Canada. Some suggest, however, that the current market situation will discourage some companies which would otherwise be here. There is also some concern that bankruptcy sales in the U.S. may bring products into Canada at reduced prices.

With demand for goods at extremely low levels, there is an excess supply of inventories and a considerable amount of excess capacity. Most plants are operating well below 50 percent of capacity and the situation is expected to worsen. Some plants are still completing work ordered late in 1985 and once this is finished they will have more idle capacity. Any companies which do not manufacture specifically to order have large inventories and many are attempting to lease equipment as an alternative to selling.

Most manufacturers expect a decrease in the number of companies in the industry. Large, stable companies will survive while small ones may disappear. It is thought that companies with multinational affiliations will have a higher survival rate.

Almost all of the manufacturers reported that current prices are lower than they were one year ago. There has not, however, been a dramatic plunge similar to what has occurred in the service and supply industry. Unlike the service and supply contractors, manufacturers are not selling below cost and do not expect to do so in the future. Prices in the manufacturing sector are said to be based almost entirely on costs with some margin of profit and the manufacturers contend that they would be better to close their plants than to sell at prices which do not cover expenses.

Manufacturers of pump jacks report price decreases of 5 to 10 percent while those producing pressure vessels have seen prices decline 10 to 15 percent. For manufacturers of drilling and wellhead tools,

prices have fallen 10 to 25 percent and all electronics manufacturers report 10 percent price decreases. Exploration and predrill equipment as well as drilling rigs are selling at prices 20 to 30 percent below those of last year.

5.2.2 Reaction to the Current Market Situation

Manufacturers tend to feel that they have always been efficient, with high levels of productivity and few luxuries or frills. Attempts to reduce costs have largely been restricted to employment measures, which are discussed in Chapter 6, and to reductions in capital expenditures. All firms have eliminated capital spending with the exception of necessary maintenance. While some companies would be willing to sell idle machinery, there have been few sales because of a lack of purchasers.

Manufacturers are not generally looking at diversification as a way of dealing with the current market situation. Most plants are highly specialized to produce equipment which is useful only in the oil industry. There are, however, some possibilities in agriculture, public works, mining, and waste management for manufacturers of pressure vessels, pumps, and other production-related equipment. However, demand in these markets is not expected to be strong.

5.2.3 Other Comments

When invited to make additional comments, most manufacturers chose to discuss the regulation of the oil industry and the role of government. In this respect, their comments were similar to those of the service and supply contractors. There was agreement that excessive taxes and royalties should be reduced and distortionary incentives should not exist. Governments were criticized for benefitting from good times in the industry while refusing to help in poor times. There is a general feeling that the oil industry should be repaid by governments through something like a floor price. It was suggested that a stable price is what is needed for companies to make plans and investment decisions.

Many manufacturers feel that unions should be more flexible. In a number of cases, large unions were thought to be ignorant of conditions in the oil industry and to be making unreasonable demands. Another comment typically made related to the fact that manufacturers

are currently having problems with bad debts. It was suggested that governments should do something to help manufacturers collect from service and supply companies which are going out of business.

5.3 Summary and Conclusions

While the oil and gas field equipment manufacturers are generally less dependent than service and supply contractors on the oil and gas industry as a source of revenue, some two-thirds of their 1985 revenue came from this industry. Another 7 percent was derived from providing services to the oil and gas industry with the remaining 27 percent coming from other goods manufacturing and non-oilfield-related services. Total 1985 revenue of $1.2 billion was up 20 percent from the 1984 figure of $962 million.

In keeping with the decline in operator capital expenditures in 1986, manufacturer revenue is expected to decline 35 percent to $745 million. Manufacturers of drilling, completion, and well service equipment appear to have been the hardest hit with current demand levels 75 to 98 percent lower than year-ago levels. Price decreases vary among the different types of equipment. Prices for drilling and wellhead tools are 10 to 25 percent lower than last year, 30 percent lower for drilling rigs, and 10 percent lower for electronics equipment. No improvement in this situation is expected although firms generally believe that the situation cannot get worse and there is great uncertainty regarding 1986. Since demand for this type of equipment tracks drilling rig activity levels and the Canadian Association of Oilwell Drilling Contractors expects total average 1986 rig activity to be less than 45 percent, these expectations could well be borne out.

Manufacturers of exploration and predrill equipment report declines in demand of over 70 percent from 1985 and price declines of 20 to 30 percent. This is to be expected given that the geophysical contractors have been among the hardest hit of the service and supply contractors.

Production equipment manufacturers appear to be the best off, although the declines in demand reported vary considerably, from 25 to 98 percent, with the types of equipment manufactured. Prices are down 5 to 15 percent from last year's levels.

Given the low levels of current demand, the manufacturers report both excess plant capacity and overstocked inventories. Other than completing work ordered in late 1985 and work made-to-order, plants are operating at less than 50 percent capacity utilization rates. Moreover, since plants are better off to close than to sell at prices which do not cover their expenses, some plants are expected to close. Those affiliated with multinational firms are expected to fare better than others.

In reaction to this situation, oil and gas field equipment manufacturers have reduced costs wherever possible. The cuts have largely affected employment costs and capital expenditures except for necessary maintenance work. Due to the specialized nature of their equipment, few firms consider diversification a viable option. Demand in other markets that could be supplied with goods manufactured using existing equipment is not perceived to be strong either.

Export market projections are more optimistic than those for total revenue. Revenue from exports of oil or gas field equipment by firms which exported in 1984 or 1985 increased 40 percent between 1984 and 1985 and is expected to continue to increase in 1986, although at a lower rate. Nevertheless, export revenue only amounted to 11 percent of total 1985 revenue. Despite the fact that 30 percent of telephone survey respondents which did not export in 1984 or 1985 plan to do so in 1986 or 1987, most manufacturers interviewed expect increasing competition and low crude oil prices world-wide to limit foreign sales. Moreover, many prospects are only viable in the short term as countries develop their own expertise.

About 30 percent of manufacturers expect a change in the level of competition in their Canadian market from imports of oil or gas field equipment. All expected a decline or at least only maintenance in their 1986 revenue from 1985 regardless of whether they expected an increase or a decrease in the level of competition. Two comments were made by several telephone interview respondents in this regard. First, the relatively low value of the Canadian dollar vis-a-vis the U.S. dollar is seen as a strong buffer from foreign, especially U.S., competition in the Canadian market. Second, manufacturers are concerned about a possible reduction in the Canadian tariff on manufactured goods which would increase their vulnerability to the world market. It is not clear from these comments whether competition from imports is a significant factor faced by oil and gas field equipment manufacturers.

In contrast to the negative situation reported by the manufacturers, they specify the highest expected crude oil prices for 1986 and 1987, as well as a broad range of prices in both years. However, 30 percent of respondents would not specify a crude oil price for 1986 and 45 percent would not report a 1987 price. This suggests that many of these firms do not have any firm idea of the direction of the key variable (by their own estimation) affecting their business environment.

In regards to the government's involvement in the industry, the manufacturers agreed that stable crude oil prices were a vital element in the health of their industry. Suggestions made included the reduction of taxes and royalties on the oil and gas operators and a floor price for crude oil. For their own part, manufacturers would like government assistance in collecting debts from financially troubled service and supply contractors. Other than that, assistance in the form of short-term incentives is considered disruptive and is not welcomed.

Chapter 6

IMPACT ON INDUSTRY EMPLOYMENT

The reductions in capital expenditures and revenues noted in the three previous chapters have been accompanied by dramatic changes in employment levels and policies. Alberta oil and gas industry employment fell 26 percent or about 23,430 employees from December 1985 to June 1986. As opposed to the 6 or 8 percent normal seasonal upswing in year-end employment recorded in 1984 and 1985, a 2 percent decline results in expected employment of 64,620 in December 1986. A total of 25,000 jobs are expected to be lost from the end of 1985 to the end of 1986. The service and supply contractors account for over 60 percent of the total decline in employment with a loss of 15,260 employees over the period.

Employee benefits have been cut by virtually all firms, particularly by the service and supply contractors, manufacturers, and smaller operators. Some firms have also decreased salaries, typically by 10 to 20 percent. In the case of some larger operators, their cuts are perceived to be simply aligning the oil and gas industry with benefit levels of other industries.

Great uncertainty prevails regarding 1987 employment levels as 30 percent of firms would not specify employment projections for that year. Further employment cuts by operators, particularly larger operators, are expected since many indicated that current employment levels are commensurate with $20 (U.S.) per barrel crude oil as opposed to the current level of about $15 (U.S.) per barrel. The employment requirements of many firms are still under review. Furthermore, the survey results do not capture the employment losses that would accompany the bankruptcies, mergers, and acquisitions that are generally anticipated in all sectors of the industry.

This chapter discusses the employment cuts and policy measures being taken by the three industry groups. In all cases, the actual employment numbers, the distributions among the categories of employees, and the percent of Alberta employment were derived from the telephone interview results. The service and supply contractor figures

are industry estimates. The operator comments are the results of supplementary telephone interviews with a total of 34 operators representing all four operator groups. The oil and gas field service and supply contractor and equipment manufacturer comments were obtained through the personal interviews. Again, the summary provides editorial comment.

6.1 Operators

6.1.1 Employment Level Changes

Total average Canadian employment by the oil and gas industry operators increased 8 percent from 1984 to reach almost 53,000 employees in 1985 (see Figure 6.1).[1] Senior operators accounted for over 50 percent of total 1985 employment followed by integrated operators with almost 30 percent. Intermediate and junior operators represented 9 percent and 7 percent of the total, respectively. Thus, despite the fact that the two smaller operator groups experienced relatively high growth rates of 11 to 12 percent between 1984 and 1985, they accounted for a very small portion of the total increase. Senior operator employment also increased by 7 percent in 1985 but the increase represented more than one-third of the total increase in operator employment.

By June 1986 the effects of lower crude oil prices were evident on oil and gas operator employment levels. Due to previous commitments

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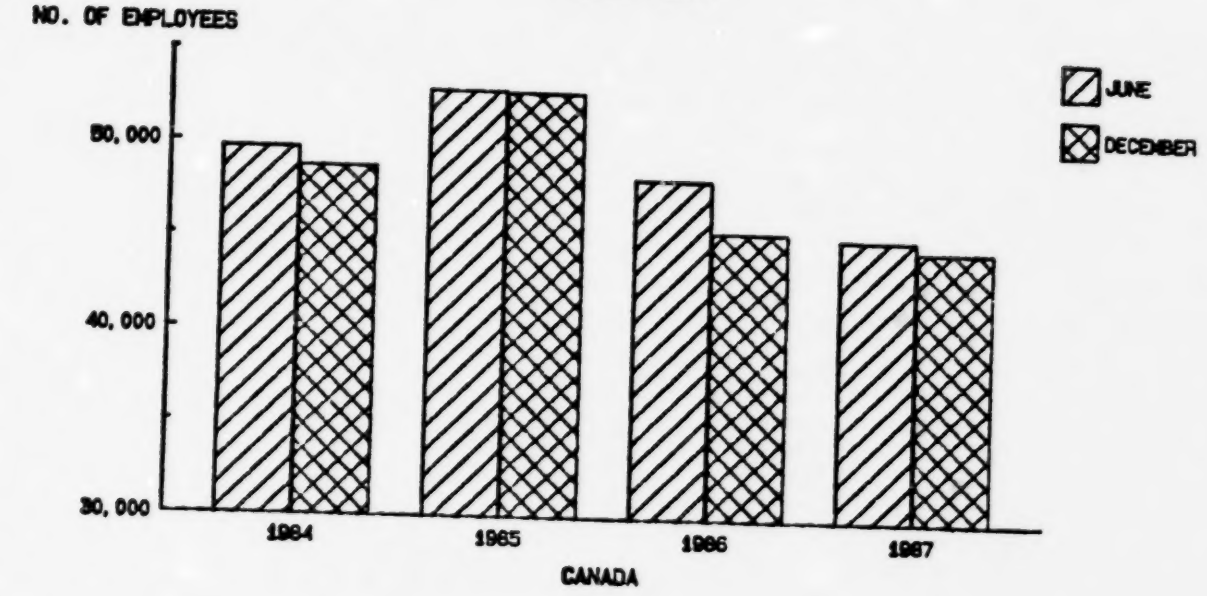
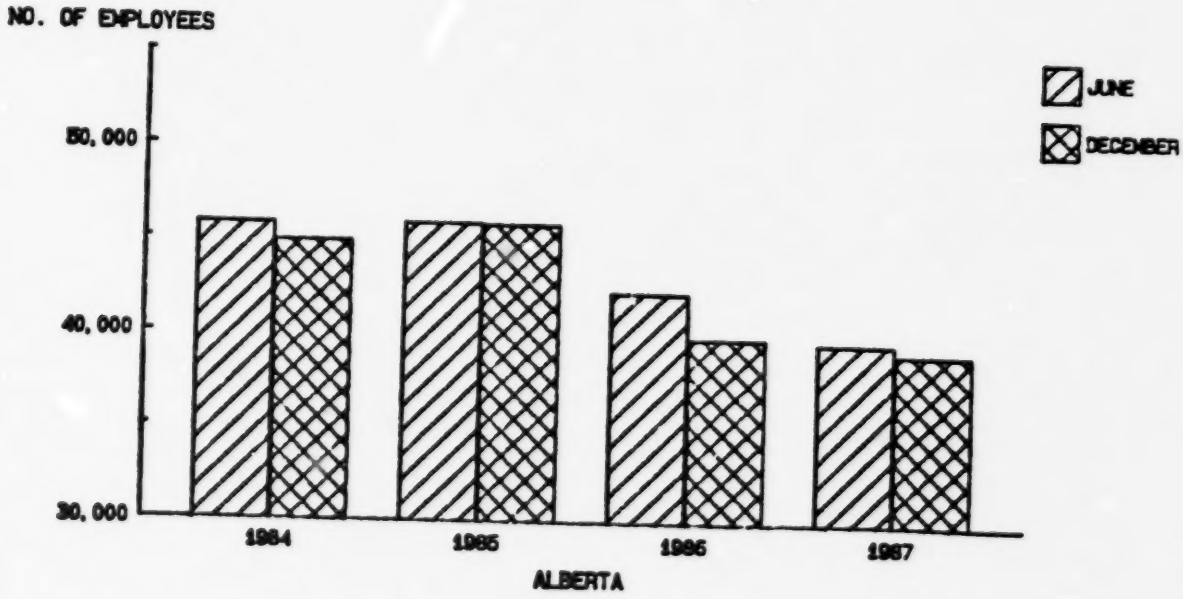
[1]It should be noted that the operator 1984 average employment figure is greater than the 36,580 reported by Statistics Canada in "The Crude Petroleum and Natural Gas Industry" (Catalogue No. 26-213, 1984). This difference is likely due to three major differences in the numbers. First, the Statistics Canada figures exclude employment by firms primarily involved in the oil sands industry. Second, Statistics Canada figures are for the average number of employees in a given year with the number of part-time people added on the basis of person years worked. Thus, Statistics Canada would count one for every two people working half-time while the survey results would count two. Finally, Statistics Canada figures include salaried management, professional, technical, and administrative workers as well as all production, field, plant, and related workers receiving pay in the last pay period of the respective month. These figures would exclude any non-salaried office staff such as owners and contract professionals or clerical staff as well as field personnel considered to be on staff but not currently active. All of these would be included in the survey totals.

FIGURE 6.1
OPERATOR EMPLOYMENT
1984-1987





Source: Tables E.1 and E.2

to university graduates and projects scheduled to commence, a few companies continued to grow through the first quarter of 1986. However, total employment fell 9 percent from December 1985 to reach 48,200 in June 1986. A further decline of 6 percent is expected by year-end 1986, yielding a total loss of over 7,300 employees from December 1985 to December 1986.

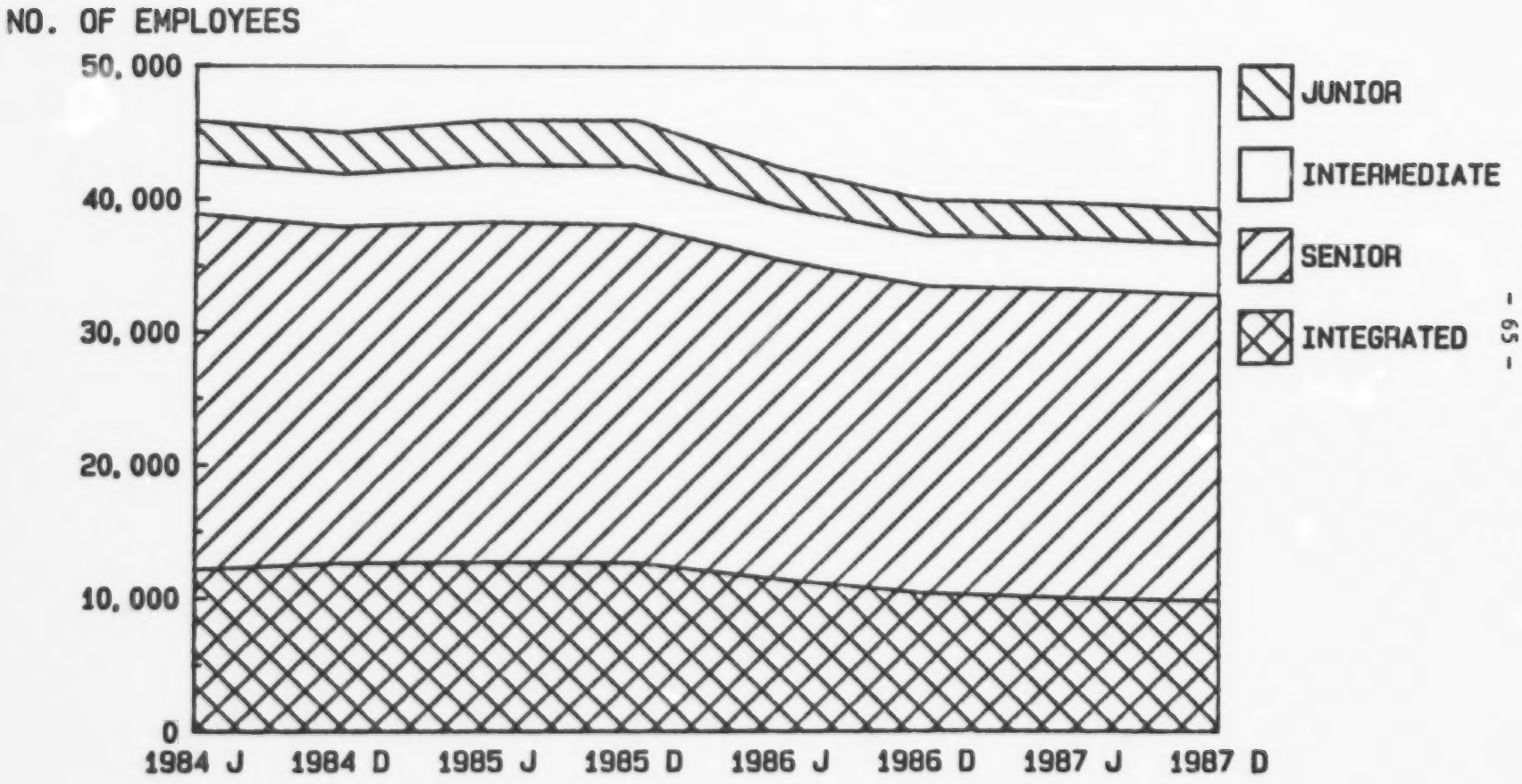
In percentage terms, the 14 percent loss of employment is fairly evenly distributed among the four groups. However, junior operator employment falls even more, declining 23 percent from December 1985 to December 1986. Nevertheless, the senior operators experience the greatest loss in terms of the absolute number of employees.

Since operator activity is concentrated in Alberta, employment in Alberta has been affected the most by the employment reductions. While capital expenditure cuts affected activity throughout the province, employment was cut the most in Southern Alberta, the location of most operator head offices. However, substantial layoffs have also occurred in Eastern Canada operations. Quite often the declines in Eastern Canada were attributed to the phasing out of the PIP grants and the lack of an adequate replacement program.

Operator employment in Alberta increased marginally (2 percent) from December 1984 to reach 45,850 in December 1985 (see Figure 6.2). The 8 percent decrease from December 1985 to June 1986 was lower than that for total Canadian employment. A further 6 percent decline results in Alberta employment of 39,890 by December 1986, a total loss of almost 6,000 from the previous year.

Various reasons for the decline were provided, virtually all of which translate into lower activity due to lower crude oil prices, the unfavourable fiscal regime, and insufficient incentive programs: cuts in capital expenditures; phase out or cancellation of high risk/cost capital projects, especially in oil sands, Canada Lands, and East Coast offshore; declines in revenue, profit margins, and available cash flow; and a general movement by firms towards a maintenance or even survival mode. For a few firms, the decline in activity and employment levels is not solely attributable to low world oil prices. These firms implemented strategic plans after the NEP that included cutbacks which have been occurring over the past few years. In addition, a growing emphasis on development and production as opposed to exploration activity has reduced requisite levels of employment for most companies.

FIGURE 6.2
ALBERTA EMPLOYMENT BY OPERATOR GROUP
1984-1987



Source: Table E.3

The reductions affect all categories of employment equally (see Figure 6.3). Professional and technical personnel account for the largest portion of operator employment (30 percent) followed by oil and gas field workers (29 percent). Sales, clerical, and related employees and managerial and administrative employees represent about 22 percent and 15 percent of the total, respectively. These distributions remain virtually unchanged from December 1985 to December 1986.

Although the total distribution appears unchanged, most companies have reorganized internally. In some cases, companies have laid off a great number of professional and technical workers, only to have management and administrative staff take over their duties. The rationale for this move is that by keeping the management people, future expansion would only require the hiring of professional or technical people rather than new managers who would be unfamiliar with the company.

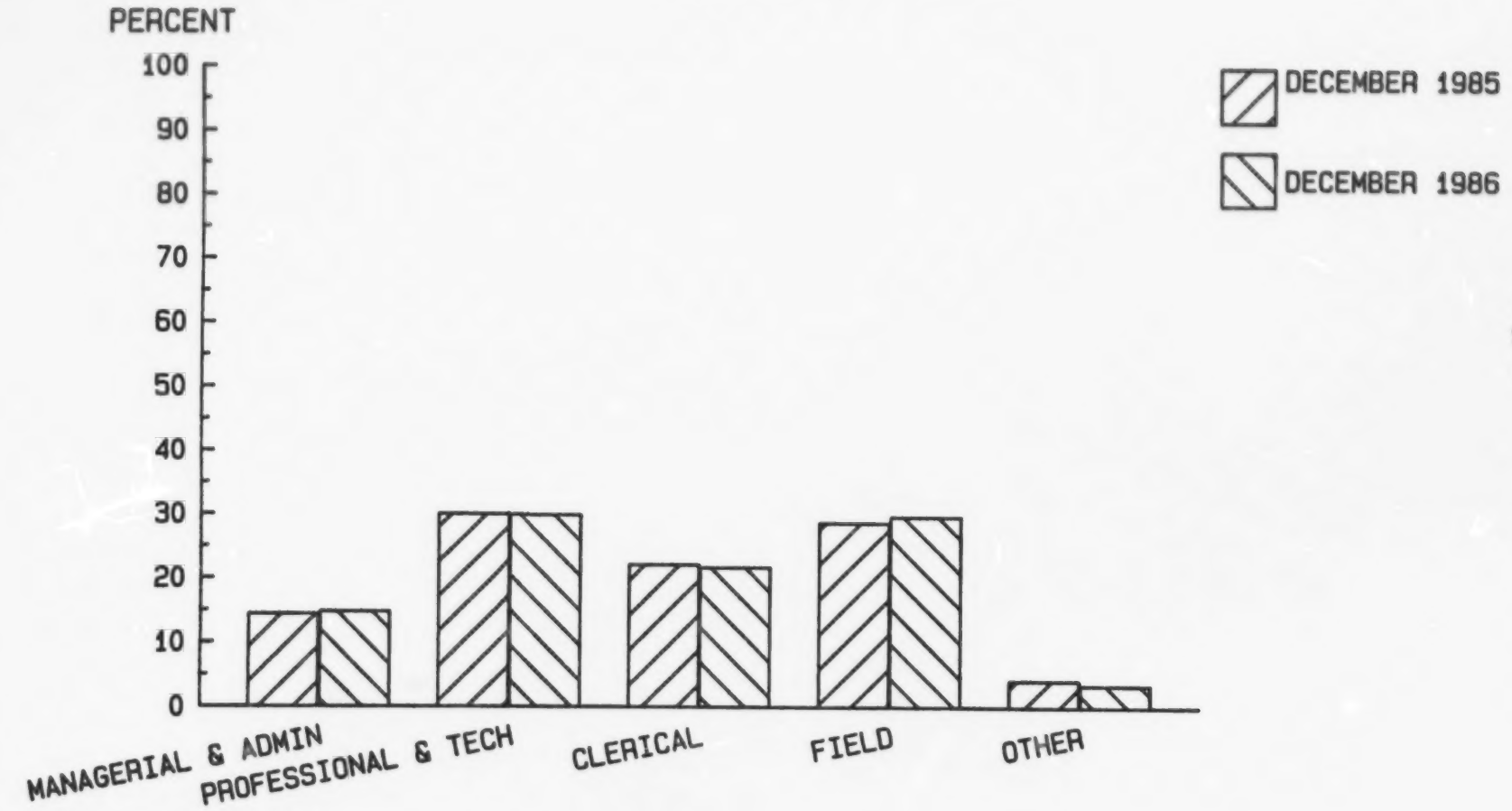
The number of part-time, contract, and seasonal employees declines by about 1,600 employees accounting for 27 percent of the total decrease in employment (see Figure 6.4). Essentially all of the large operators have eliminated part-time workers. None of the firms indicated that the employment decline was seasonal in nature. However, in some cases the number of summer students was reduced or the summer student program was eliminated. Temporary employees were not generally hired this summer to cover for vacationing staff. One company used a small floating pool of internal workers instead to cover for staff on holidays.

6.1.2 Employment Policy Changes

Results from the supplementary interviews indicate that the measures being used to facilitate the employment cuts primarily vary according to the size of the firm. Management's level of optimism, the historic employment policies of the company, the extent of diversification of the firm's operations, and the debt load affected the degree of the cutback measures planned or already taken.

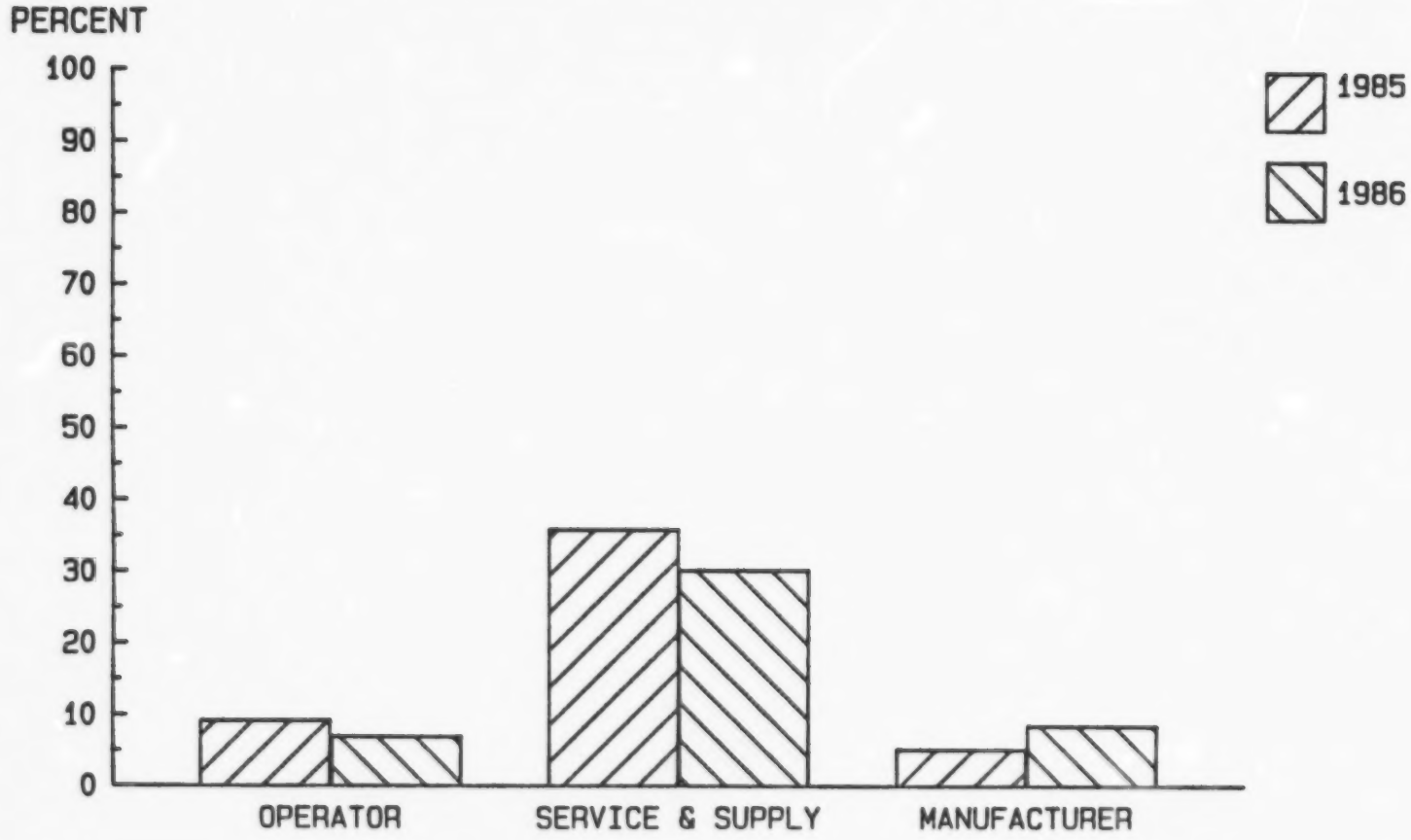
In many cases, smaller firms would lay off a few professionals, let clerical staff numbers decline by attrition, and have managers and administrative staff cover for their positions. In general, layoffs in the office occur in areas like exploration where there is no longer any workload. Field people are usually all retained or in rare cases, work in a job-sharing situation. The tendency of the smaller companies

FIGURE 6.3
OPERATOR EMPLOYMENT BY EMPLOYEE CATEGORY
1985-1986



Source: Table E.2
Note: Other includes manufacturing, construction trades, and other employees.

FIGURE 6.4
PART-TIME AND SEASONAL EMPLOYMENT BY INDUSTRY GROUP: 1985-1986



Source: Survey results.

appears to be to lay off permanent staff and use consultants or temporary people when the workload demands additional help.

The measures employed by large firms are, of necessity, more extensive than those of the smaller operators. The first emphasis of all companies was to reduce capital spending. People cuts came next by means of selective layoffs, eliminating the less productive employees, employees in positions or departments where there is no longer any workload, and redundant employees. In some cases, terminations or permanent staff reductions are being used rather than layoffs. One company completed their necessary staff reductions by means of an attractive enhanced voluntary leaving program. One large company used their worldwide subsidiaries to re-position some of their employees.

Most of the large operators are offering or have offered early or enhanced retirement programs to decrease their employment. In some cases, only certain employees are approached with specific packages while in others the program is available to any employee who meets certain criteria. Eligible employees generally have to be at least 55 years old and have a specified length of company service. A common package provides an additional five years of employment credit to the retiring employee. Although early retirement is typically offered on a voluntary basis, in some cases it is voluntary "with a nudge," while in others the only alternative to retiring is to be laid off.

Attrition policies have been adopted by virtually all of the larger firms. In fact, a few firms have had a hiring freeze in place since the NEP. Only essential positions are being filled, and then often by an internal reorganization. This policy generally affects the clerical staff as the market for professionals is depressed.

These staff reductions have resulted in some redistribution of workload within companies. In general, employment cuts are commensurate with the decline in activity such that the workload for the remaining staff has not changed dramatically. However, general reorganization and leaner structures do result in some senior people covering for junior positions and vice versa. Some large operators are taking advantage of the relatively low activity levels to train junior employees for vacated senior positions. In certain instances, emphasis was placed on laying off some of the higher salaried employees, leaving the more junior professionals to fill the vacant senior positions. The general workload redistribution has also provided some companies with an opportunity to integrate more computers into their operations.

In addition to employee cuts, other employment policies have been changed to further reduce employment costs. Smaller operators are changing some full-time positions to part-time. Part-time or temporary staff are also being utilized where the workload is too great for the reduced full-time staff. In some cases, the work day has been lengthened.

Other measures taken by small operators include pay cuts or freezes and/or benefit cuts. Pay cuts range from 10 to 20 percent and affect all employees. Management typically take larger cuts. Benefit cuts include eliminating company cars or introducing a cost-sharing program, cancelling dental care programs, dropping savings plans, and eliminating such extras as expense accounts, conventions, and courses.

Larger operators are introducing similar policies to reduce employment costs. Part-time, contract, and temporary employees are being largely eliminated. In some cases, the work day has been lengthened to maintain output with the reduced staff. Pay cuts are not common among large operators. However, certain companies have down-graded the job classification of some employees, thereby decreasing salary levels. Essentially, all firms have implemented pay freezes, particularly at the executive level. For some firms, salary increases have been very limited since the NEP.

In addition to the direct reductions of employment costs, benefits are also being cut by the large operators. Health and dental insurance plans have been eliminated or changed; company cars have been taken away, are on a cost-share basis, or have been replaced by a small car pool used for travel just from the office to the field; expense accounts and travel have been restricted. One firm has eliminated free coffee for office employees as well as the subsidies on food in the cafeteria. Some companies indicated that the benefit cuts are just bringing the oil and gas industry in line with benefit levels in other industries.

6.1.3 Employment Outlook

Further reductions in employment are expected to the end of 1987 (see Figure 6.1). An average decrease of 4 percent between 1986 and 1987 results in year-end 1987 employment of about 45,000 in Canada. However, several companies would not elaborate on future employment changes as their employment needs are still under study due to the uncertainty surrounding the future.

The operators generally reported that a stable crude oil price of $20 (U.S.) per barrel would be required before existing employment polices and plans would be changed. One company indicated that their employment cuts were now adequate for $10 (U.S.) per barrel of crude oil. However, other firms indicated that unless crude oil prices rose to the level of $28 to $30 (U.S.) per barrel, further employment cuts would be made. Alternatively, a change in the fiscal regime which increased operator margins would have effects similar to a significant crude oil price increase. In fact, changes like reduced royalties, elimination of PGRT, and additional government incentives for frontier development were cited as being more confidence-inspiring than an increase in crude oil prices. All companies indicated that a stable environment was the most significant prerequisite for employment policy changes.

Even under the conditions stated above, changes in employment policies would occur very slowly. Layoffs, hiring freezes, and attrition policies would be halted. Hiring would occur over a six- to twelve-month period and then only for specific positions. Emphasis would be placed on reducing bank debt and accumulating some cash reserve first. Several of the operators would utilize temporary employees or consultants initially before hiring permanent employees. Even temporary employees would be hired on a project-by-project basis only.

Permanent employees would be hired for specific positions depending on the types of activity being undertaken by the firm. Laid-off employees would be rehired very selectively since they were generally the marginal and/or "least liked" employees. In some cases, firms view the situation as an opportunity to upgrade their staff. Large operators would concentrate on hiring recent graduates as they prefer to train their own workers. The smaller firms generally would seek out more experienced people.

In general, professional and technical staff would be required which would eventually necessitate more support staff. While the emphasis would be on professional staff, no major structural changes are anticipated. After the NEP, a few major companies underwent major reorganization and structural improvements so that no further changes are required. Firms will generally be leaner and younger as a result of the changes that have occurred.

6.2 Service and Supply Contractors

6.2.1 Employment Level Changes

Employment by the total service and supply contractor industry for their Alberta based operations increased 16 percent from December 1984 to reach almost 34,000 in December 1985 (see Figure 6.5). The employment increase followed the increase in operator capital expenditures over the same period (see Figure 3.3). The subsequent decrease in operator capital expenditures has been paralleled by a decrease in service and supply contractor employment. In June of 1986, service and supply contractor employment was almost 50 percent less than employment in December 1985. An increase of 11 percent is expected by December of 1986, half the seasonal percentage increase experienced in 1984 and 1985. Expected employment of about 19,000 by the end of 1986 is only 55 percent of year-ago employment.

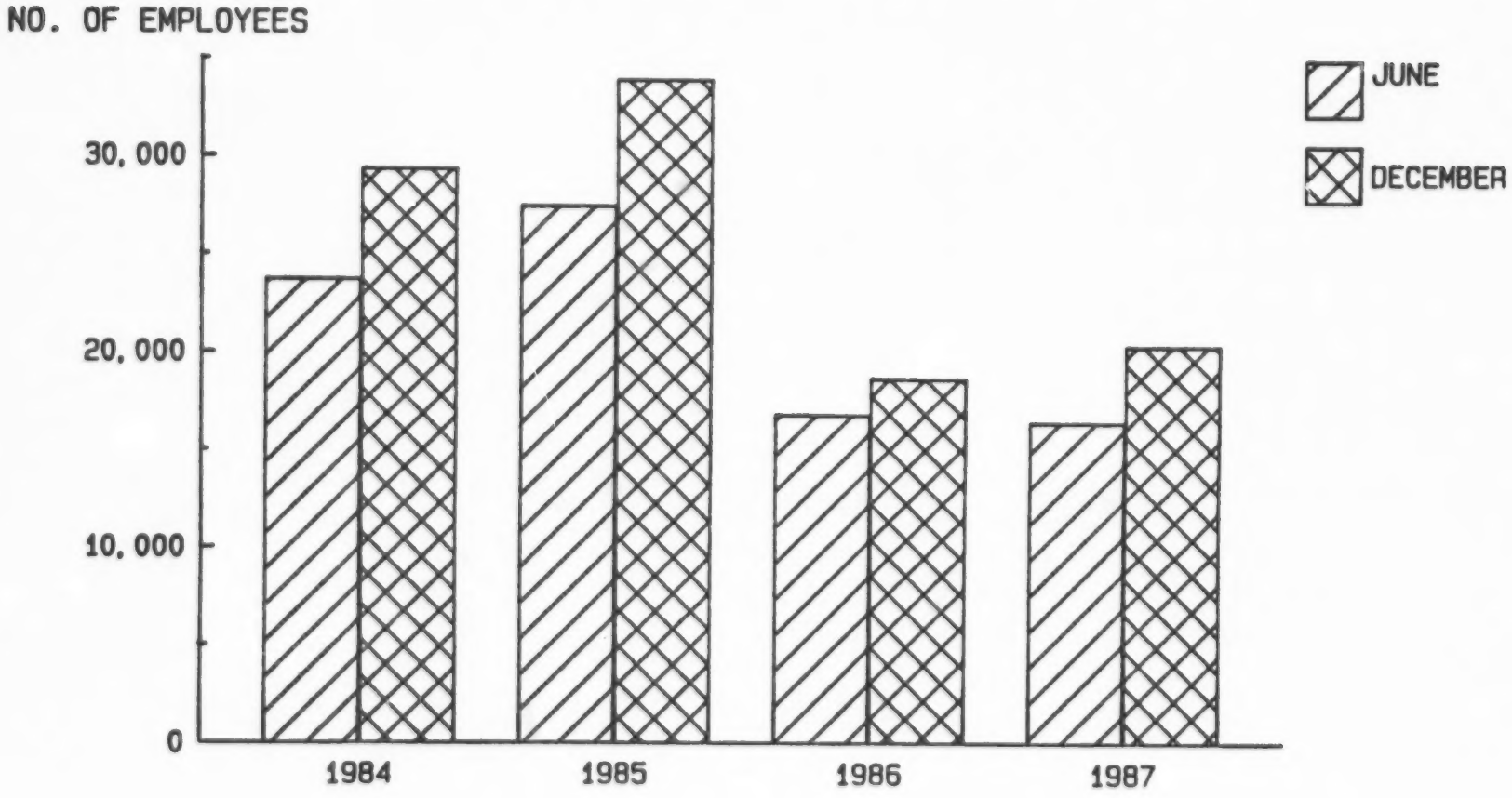
Although the service and supply industry is seasonal in nature (as depicted in Figures 6.4 and 6.5), the employment cuts being made are not a result of seasonal adjustments. Some 36 percent of total 1985 service and supply contractor employees were part-time, seasonal, or contract workers. However, this proportion is expected to decrease in 1986 to only 30 percent of the total indicating that, on a proportionate basis, employee cuts are primarily affecting seasonal workers. In fact, while employee cuts are affecting all employment categories, oil and gas field workers account for 78 percent of the total decrease in employment from December 1985 to December 1986 (see Figure 6.6). The proportions of managerial, professional, and clerical staff all increase at the expense of the oil and gas field workers.

6.2.2 Employment Policy Changes

Most cost-cutting measures being implemented by service and supply contractors are employment-related. The staff reductions described above are typically due to extensive layoffs. Few firms are offering early retirement programs.

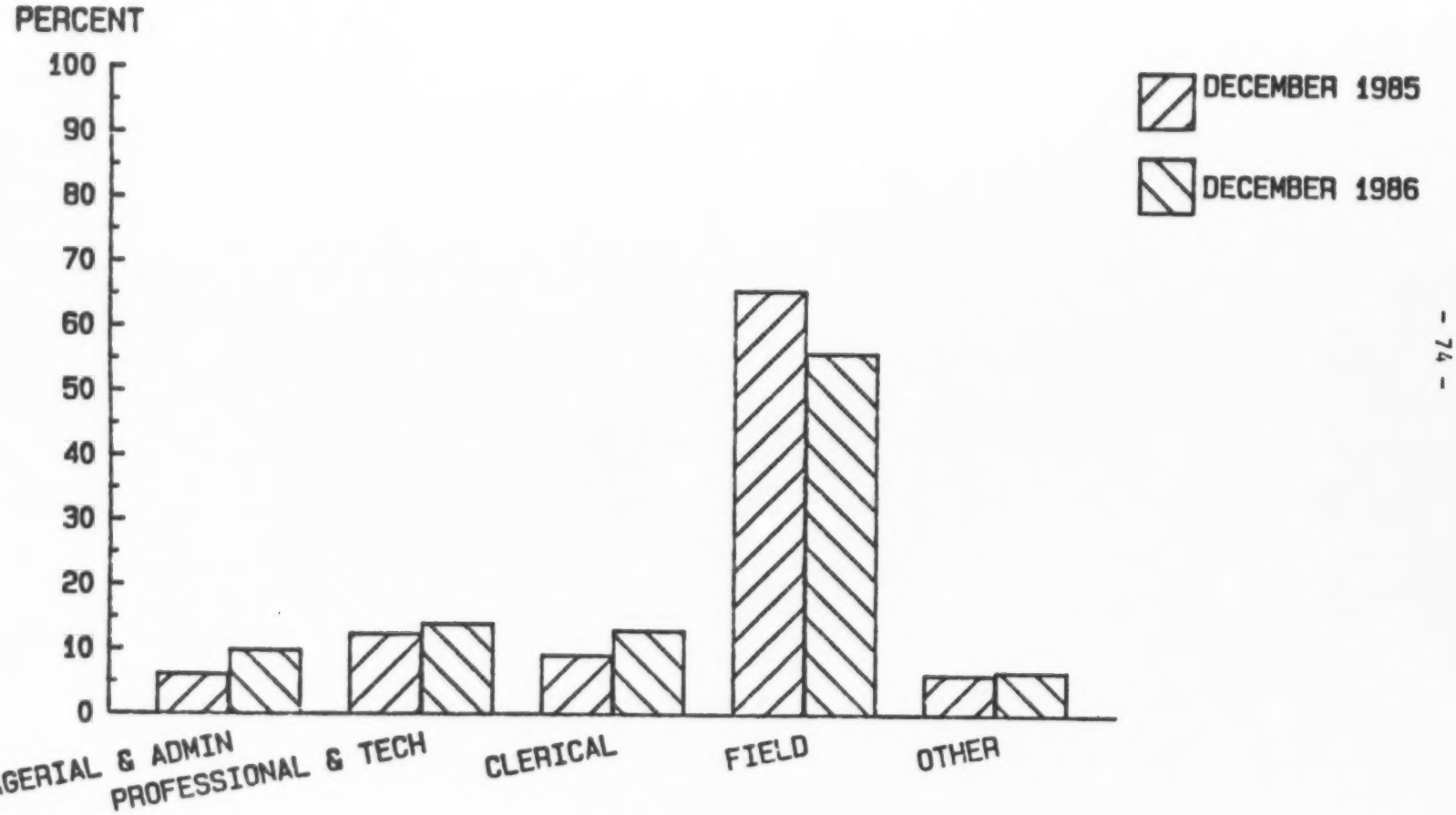
In addition to staff cuts, many firms are implementing pay and/or benefit cuts. The number of company cars has been greatly reduced while company-sponsored club memberships have almost disappeared. Entertainment expenses have decreased and, in many cases, small perks such as juice in the office refrigerator have been eliminated. The length of the workweek has increased at a large number of companies as

FIGURE 6.5
SERVICE AND SUPPLY CONTRACTOR INDUSTRY
ALBERTA EMPLOYMENT: 1984-1987



Source: Table E.3

FIGURE 6.6
SERVICE AND SUPPLY CONTRACTOR ALBERTA
EMPLOYMENT BY EMPLOYEE CATEGORY: 1985-1986



Source: Table E.2
Note: Other includes manufacturing, construction trades, and other employees.

a result of extensive layoffs. In general, work sharing is not seen as a viable option. Managers tend to feel that work sharing creates dissatisfaction and that it may encourge the best workers to find employment elsewhere.

6.2.3 Employment Outlook

As previously discussed, the service and supply contractors expect some modest improvement in the demand for their services by the end of 1987. Mid-year 1987 employment is still expected to be lower than June 1986 employment, but year-end 1987 employment is anticipated to increase marginally over the corresponding 1986 level (see Figure 6.5). However, this is likely attributable to seasonal impacts only as the 24 percent increase over the June figure corresponds to that of both 1984 and 1985.

6.3 Manufacturers

6.3.1 Employment Level Changes

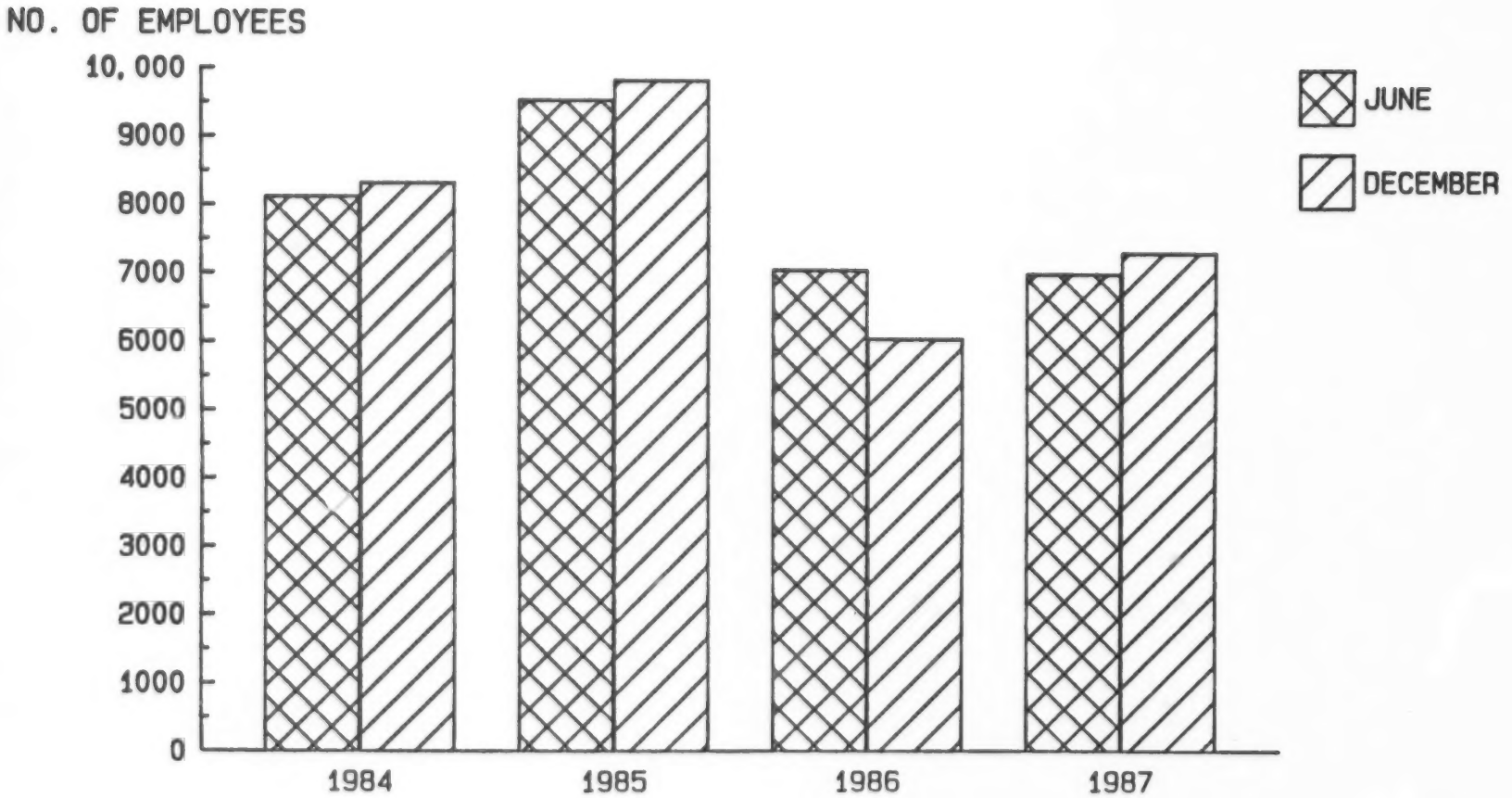
As with the other industry groups, employment by the oil and gas field equipment manufacturers for their Alberta based operations increased in 1985 over 1984. Total manufacturers' employment of 8,320 in December 1984 increased 18 percent to reach over 9,800 in December 1985 (see Figure 6.7). However, in conjunction with the employment reductions in the other industry sectors, manufacturer employment fell 28 percent by June 1986 and is expected to decline by another 14 percent by December 1986. In fact, a decrease of almost 40 percent is expected from year-end 1985 to year-end 1986, resulting in December 1986 employment of about 6,050.

Manufacturing, assembly, and repair staff account for almost 70 percent of the employment reduction between December 1985 and December 1986 (see Figure 6.8). The proportion of total employment represented by the managerial, professional, and sales and clerical employees increases over the period at the expense of the manufacturing, assembly, and repair workers.

6.3.2 Employment Policy Changes

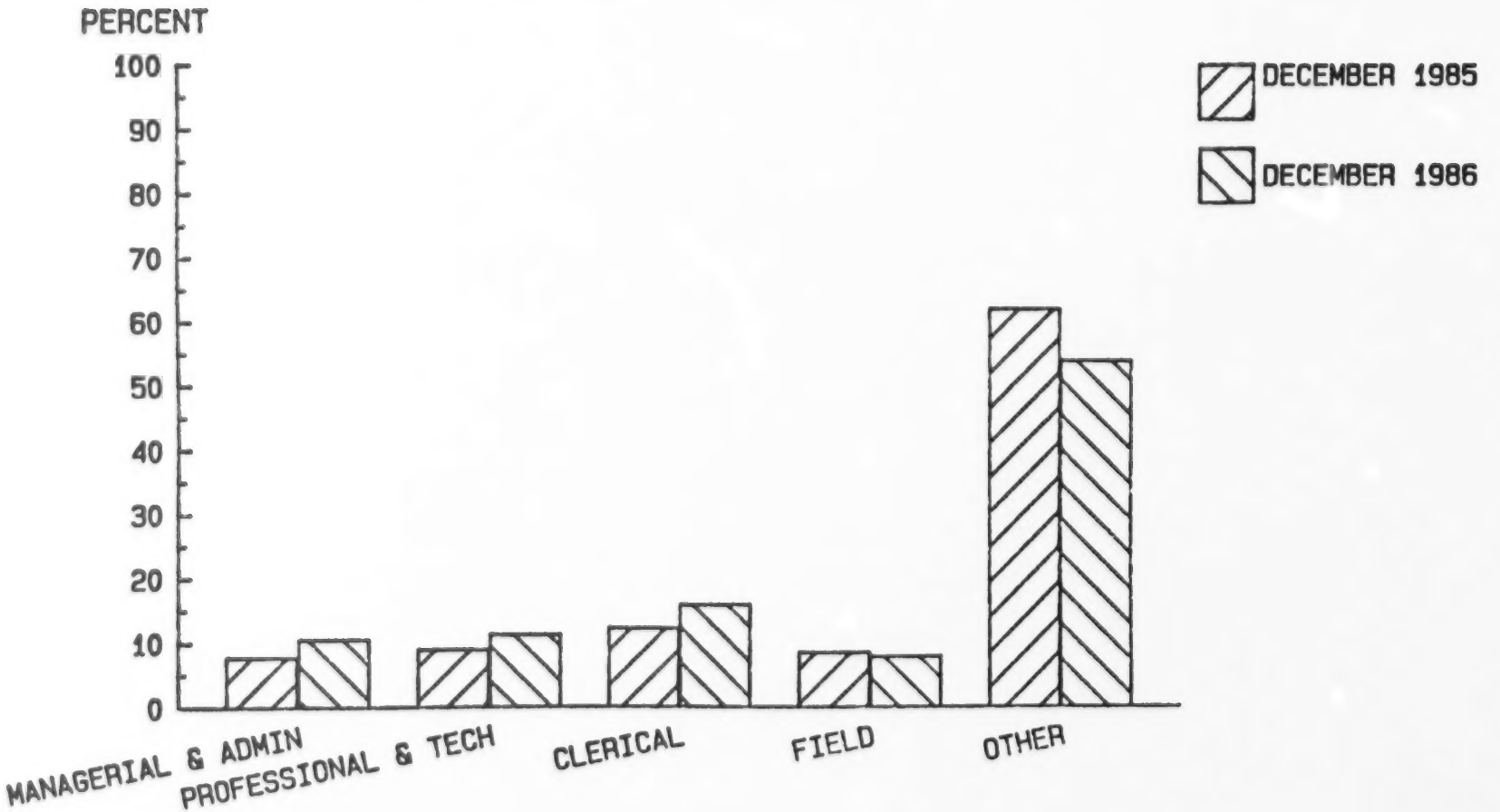
As with the service and supply contractors, oil and gas field equipment manufacturers are reducing operating costs by cutting employment. The staff reductions noted above have largely occurred

FIGURE 6.7
MANUFACTURER ALBERTA EMPLOYMENT
1984-1987



Source: Table E.3

FIGURE 6.8
MANUFACTURER ALBERTA EMPLOYMENT BY EMPLOYEE CATEGORY: 1985-1986



Source: Table E.2
Note: Other includes manufacturing, construction trades, and other employees.

through layoffs. Attrition policies are also decreasing staff in most firms. Early retirement programs are available in a few firms.

In addition to reducing staff, most firms have made other changes to their employment policies. Many companies have lengthened the workday for their remaining employees, and work sharing has been introduced by a number of manufacturers. This is seen largely as a short-term measure and it is understood that more layoffs will be necessary if the market situation does not improve. Union members are generally not subject to such measures because of the nature of their contracts. In some cases this is thought to necessitate more layoffs than might otherwide be required.

6.3.3 Employment Outlook

Commensurate with the positive revenue expectations reported by the oil and gas field equipment manufacturers, employment is also expected to increase to the end of 1987. Total manufacturer employment is anticipated to increase 16 percent from December 1986 to reach 7,000 by June 1987 (see Figure 6.7). Despite a further 4 percent increase, year-end 1987 employment of 7,300 is still only three-quarters of peak employment in December 1985. However, these 1987 figures are less certain as 30 percent of the manufacturers could not provide estimates for that year.

6.4 Summary

The employment effects of the decline in crude oil prices in 1986 were apparent by June of that year, with Alberta employment levels down 26 percent from year-end 1985 levels (see Table 6.1). The normal year-end increase in employment of 6 to 8 percent for the 1986 high season is expected to be replaced with a further decrease of 2 percent, resulting in a net decrease in employment by the three industry groups of 25,000 between December 1985 and December 1986.

Over 60 percent of the total decline in employment is accounted for by the service and supply contractors who expect a total decrease of 15,260 employees over the period. Although the decrease in manufacturer employment is less than that of operator employment, the manufacturers' employment decline is much more significant in percentage terms, amounting to 38 percent of December 1985 employment as compared with only 13 percent for the operators.

TABLE 6.1

OPERATOR, SERVICE AND SUPPLY CONTRACTOR, AND MANUFACTURER
ALBERTA EMPLOYMENT[a]
1984-1987

Industry Group	1984		1985		1986		1987	
	June 30	Dec. 31	June 30	Dec. 31	June 30	Dec. 31	June 30	Dec. 31
Operators[b]								
Integrated	12,126	12,647	12,741	12,671	11,404	10,346	9,986	9,757
Senior	26,763	25,229	25,477	25,323	23,960	23,071	23,217	22,954
Intermediate	3,894	3,973	4,319	4,420	3,990	3,826	3,808	3,825
Junior	3,069	3,092	3,365	3,438	2,944	2,647	2,665	2,652
Total	45,852	44,941	45,902	45,852	42,298	39,890	39,676	39,188
Service and Supply Contractors								
Respondents	15,821	19,570	18,315	22,623	11,208	12,451	10,963	13,574
Industry	23,732	29,355	27,473	33,935	16,812	18,677	16,445	20,361
Manufacturers	8,124	8,320	9,528	9,817	7,060	6,053	7,011	7,319
TOTAL INDUSTRY	77,708	82,619	82,903	89,604	66,170	64,620	63,132	66,868

[a]Includes part time, seasonal, and contract employees.

[b]Operator Alberta employment was calculated from the respondents Canadian employment results by multiplying by the percentage of employment for their Alberta based operations. The 1984 figure of 92.18 percent was derived from Statistics Canada actual figures. The 1985 and 1986 figures were provided by the respondents. The 1986 figure was used as a reasonable approximation for 1987.

The measures used to decrease employment vary among the three industry groups. Layoffs predominate among the service and supply contractors and manufacturers, primarily affecting their field and manufacturing workers. Although the layoffs are affecting all employee categories, the proportion of managerial, professional, and clerical staff is expected to increase somewhat for both service and supply contractors and manufacturers.

Operators are typically utilizing a variety of measures to reduce staff. Layoffs figure less prominently in this industry sector, with most firms offering early retirement programs. These affect all categories of employees and are typically voluntary. However, in some cases the only alternative to early retirement is to be laid off.

Virtually all firms have a hiring freeze in place, allowing employment to decrease by attrition as well as by other employment reduction policies. Hiring is very limited and only for specific, vital positions that have been vacated.

In addition to the policies implemented to decrease the number of employees, employment costs have also been reduced by various other measures. Many firms in all three groups have lengthened their work week to maintain productivity with their remaining staff. While some manufacturers have introduced work sharing programs, these are generally not compatible with the employee requirements of the other two industry groups and, therefore, are not being widely used.

Pay cuts are common among the service and supply contractors while the operators and manufacturers have generally implemented pay freezes. Where pay cuts or freezes have occurred, management is typically affected to a greater extent than the other employees.

Benefits have also been reduced by many firms. These range from reduction of air travel, company cars, club memberships, or conference attendence to elimination of dental care programs. Entertainment and travel expenses are universally being either reduced or at least closely monitored.

The differing price and market expectations reported by the three industry groups result in differing expectations for 1987 Alberta employment. The operators expect a continuing decline in employment to the end of 1987, commensurate with the decreases expected in capital expenditures to 1987. Similarly, both the service and supply contractors and the manufacturers anticipate increases in employment

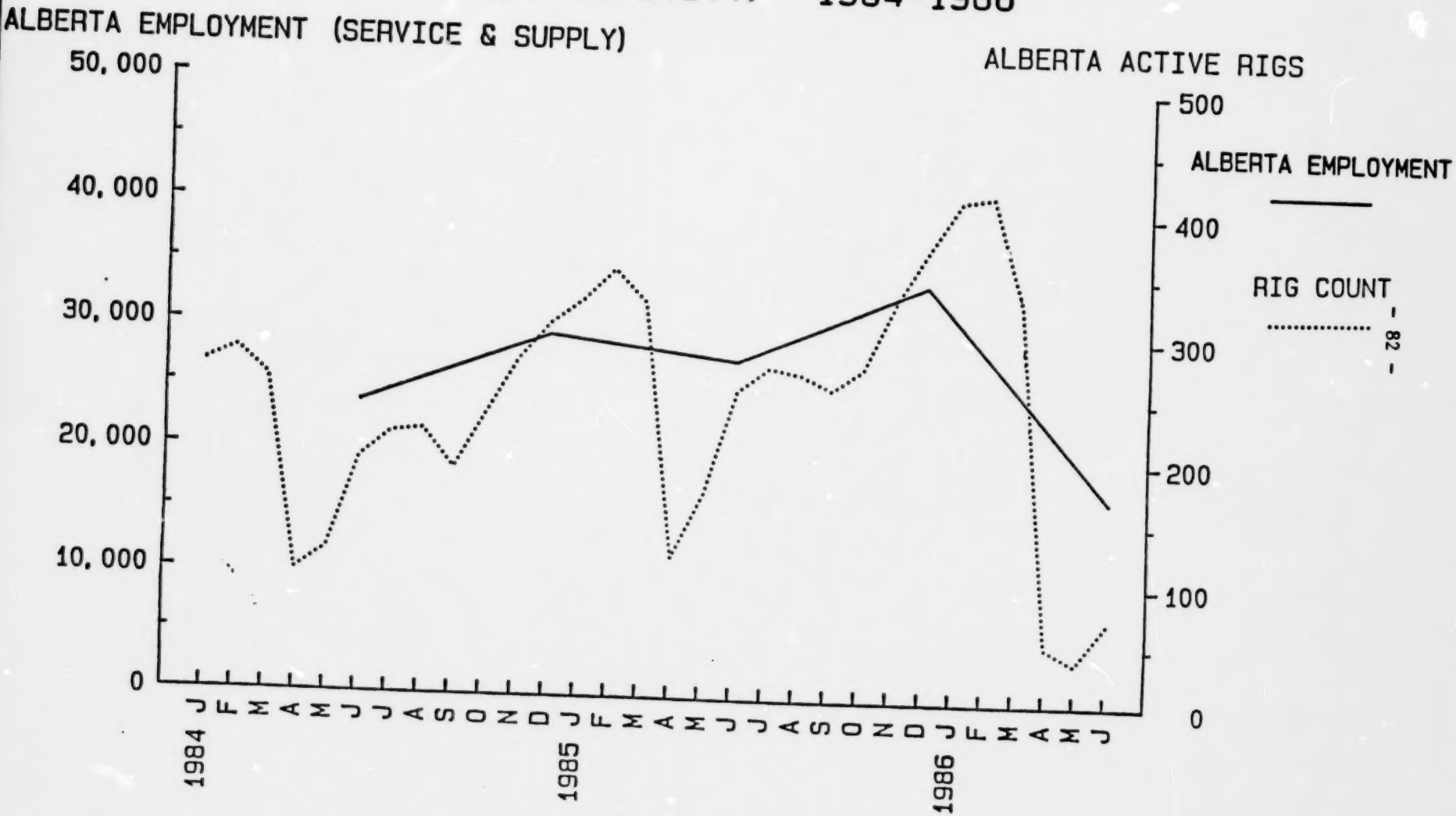
from year-end 1986 levels, commensurate with their relatively optimistic revenue expectations. The total of the three groups shows a net increase in anticipated industry employment of less than 4 percent from December 1986 to December 1987, an increase of 2,250 employees.

Despite the expected net increase in employment reported by the three industry sectors, several factors indicate that further employment cuts may yet be forthcoming, particularly from the operators. The operators generally indicated that capital expenditures were the first to be cut in response to the decline in crude oil prices. Several indicated that the situation allowed for some housecleaning of marginal or unproductive staff, and that employment levels are still of the magnitude required for activity levels that accompany crude oil prices of $20 (U.S.) per barrel. Many firms indicated that they were continuing to decrease employment through various programs and that they were still studying their employment requirements. A few firms mentioned that further cuts would be made if prices remained at $15 (U.S.) per barrel. This possibility is supported by the fact that initial cuts were announced by at least one major operator during the course of the interview process, and several others have subsequently made public announcements of additional cuts.

In addition to possible future employment cuts, further benefit reductions are also likely. While some cuts are being made in primary benefits such as health care coverage, most are luxury items such as travel, expense accounts, club memberships, and company cars. Several operators mentioned that such reductions simply align the industry with benefit levels prevalent in other industry sectors. Moreover, several firms indicated that not all such luxuries were being cut. One firm reported that they were continuing to travel first class and would not forego a company-sponsored sports tournament despite the considerable cost involved. All of these factors indicate excess in operator employment levels and costs that would likely be eliminated if crude oil prices do not recover.

This surplus is not evident in oil and gas field service and supply contractor and equipment manufacturer employment. Labour constitutes the largest element in their variable costs and, therefore, is the first to suffer loss. Service and supply contractor employment is directly related to drilling rig activity as seen in Figure 6.9. Employment per active rig fell about 5 percent from 1984 to reach 92 in December 1985, likely due to the lower price levels for their services mentioned by the drilling and service rig contractors. Employment per

FIGURE 6.9
SERVICE AND SUPPLY CONTRACTOR ALBERTA EMPLOYMENT vs. RIG ACTIVITY: 1984-1986



Source: [illegible] Table E.3 [illegible]

active rig in June of 1986 was 240, indicating that large numbers of permanent staff (likely office staff and management) have been retained. Based on projections by the Canadian Association of Oilwell Drilling Contractors of average 1986 drilling rig activity of less than 45 percent and the December 1985 figure of 92 employees per active rig, only about 18,400 persons will be required by the service and supply contractors in 1986. This compares favourably with the survey employment estimate of 18,700 in December 1986. Thus, further reductions in employment will likely result from closures rather than from layoffs.

Manufacturer employment follows the general trend of drilling rig activity without the seasonality of the contractors. Nevertheless, the results of both groups indicate that field and production workers have been cut to minimum levels with smaller reductions in management and clerical staff. Benefits also seem to have been cut as much as possible in most cases.

One concern particularly mentioned by manufacturers was that the skilled tradesmen who were being laid off were moving to Eastern Canada. As such people are difficult to replace, several manufacturers cautioned that their production could not readily track a sudden increase in activity.

Finally, it must be noted that considerable uncertainty still accompanies employment projections. Almost 30 percent of respondents would not specify employment figures for 1987. Although the operators appeared to be the most certain of their employment forecasts, they also seem the most likely to initiate further employment reductions.

A further element of uncertainty arises because many firms are likely to go out of business during the next 18 months, either through bankruptcy, mergers, or acquisitions. Mergers and acquisitions inevitably result in staff rationalizations, especially in difficult times, and any firms going out of business entirely will not need any employees. The impacts of these types of restructuring have not been captured in the survey results.

Chapter 7

SUMMARY AND CONCLUSIONS

In the first few months of 1986, world oil prices fell more than 50 percent, dramatically affecting the world oil and gas industry. The decrease in revenue experienced by Canadian oil and gas operators has resulted in a 32 percent cut in planned capital expenditures in 1986 and a 14 percent decline in employment by December 1986. These measures directly impact the oil and gas field service and supply contractors and equipment manufacturers, in turn affecting their expenditures and employment. These two groups expect declines in 1986 revenue of 42 percent and 35 percent, respectively, over 1985 and Alberta employment decreases of 45 percent and 38 percent, respectively. The purpose of this study has been to quantify the total impact on each sector and to discuss the nature of the measures being implemented by the industry in response to the current market situation.

The data presented are based on a survey of oil and gas operators, service and supply contractors, and manufacturers. Some 96 percent of the target population of 782 firms responded to the questionnaire. The operator target population represents about 90 percent of industry capital expenditures and employment, primarily missing the smaller firms in the total industry. The service and supply contractor target population is a sample of four major industry sectors; geophysical contract services, drilling and service rig contract services, supply store services, and other miscellaneous oil and gas field services. Missing sectors included oilfield trucking contractors, rig movers, oilfield construction contractors, and a full range of consulting services. The survey results are expanded by a conservative factor to estimate those sectors of the industry that are captured in the survey target population. The manufacturer target population is considered to be a census listing of the industry. Qualitative information was obtained through supplementary interviews with a representative sample of 100 of these firms.

The following section summarizes the survey results for all three industry groups. The final section provides comments on the results.

7.1 Summary

7.1.1 Operators

Operator capital expenditures are expected to decline 32 percent in 1986, falling from $10.7 billion in 1985 to $7.2 billion in 1986. A further decline to $6.3 billion is expected in 1987, the lowest level of operator capital expenditures since 1979 in nominal dollars. After adjusting for inflation, the expected level of 1987 capital expenditures is the lowest since 1975. Alberta is expected to suffer a decrease in capital expenditures in excess of $2 billion (see Figure 7.1). However, in relative terms, the proportion of Alberta expenditures increases from 59 percent in 1984 to 81 percent in 1987. The proportion of expenditures on development, including production, also increases over the period. Development expenditures in 1986 are expected to be down 29 percent from 1985 levels, but no further decreases are expected in 1987.

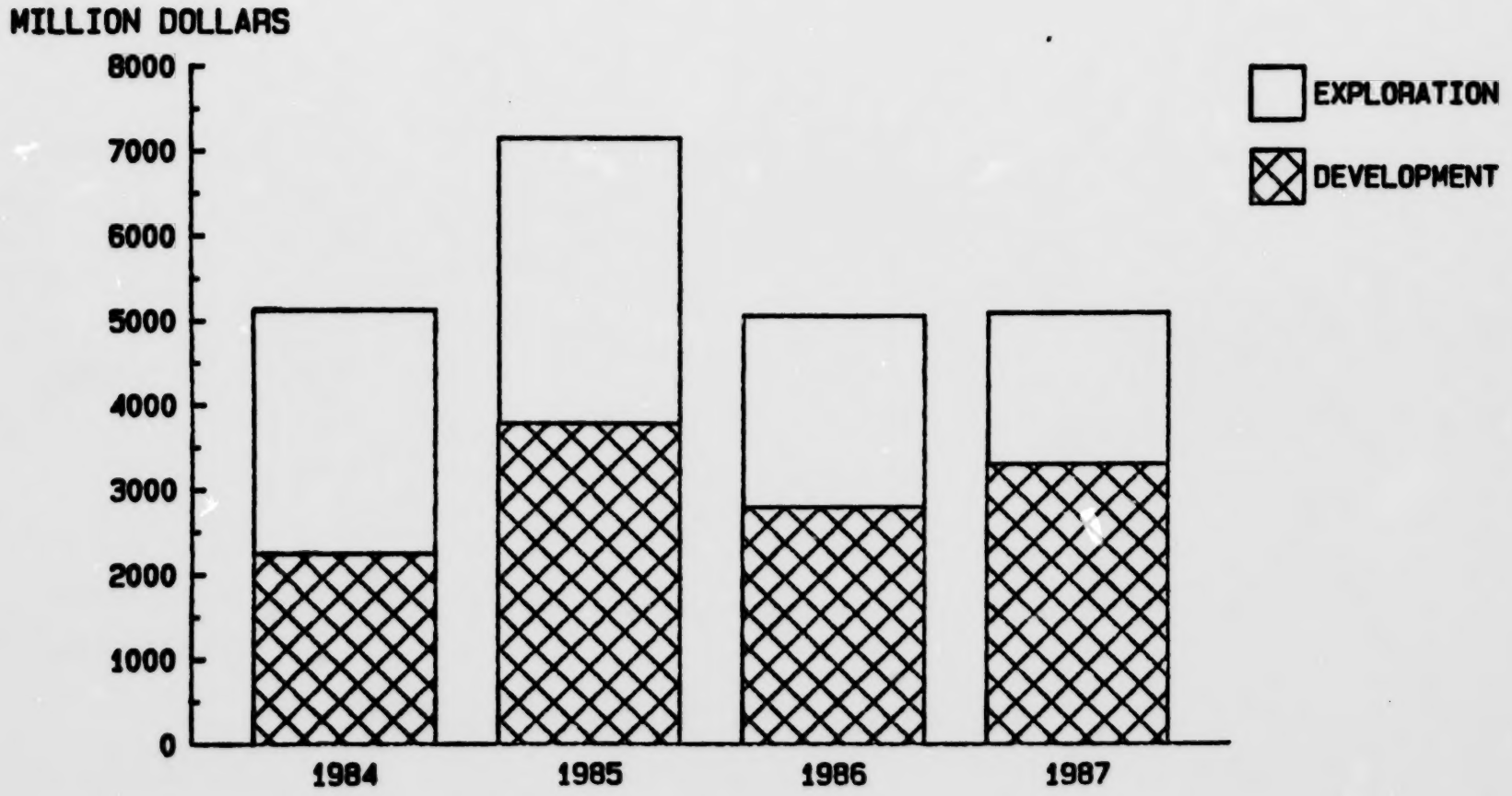
Only the junior operators indicated a significant degree of uncertainty regarding their 1987 projections.

7.1.2 Service and Supply Contractors

In conjunction with the decline in operator capital expenditures, service and supply contractor revenue is expected to decline 42 percent from 1985 levels to reach $2.1 billion in 1986, about $1.6 billion of which comes from service activity in Alberta (see Figure 7.2). Despite the relatively high crude oil prices expected by the service and supply contractors, a further decrease of 3 percent in 1987 revenue is anticipated. However, about half of the survey respondents would not specify the expected change in their 1987 revenue over 1986. Interview responses indicated that the current volume of demand for services is 50 to 80 percent less than year-ago levels. Prices have declined as much as 45 percent from already low levels, forcing some firms to operate below cost to maintain cash flow. Due to the long lead time associated with price increases and the excess capacity which exists in the industry, prices are expected to remain depressed for some time.

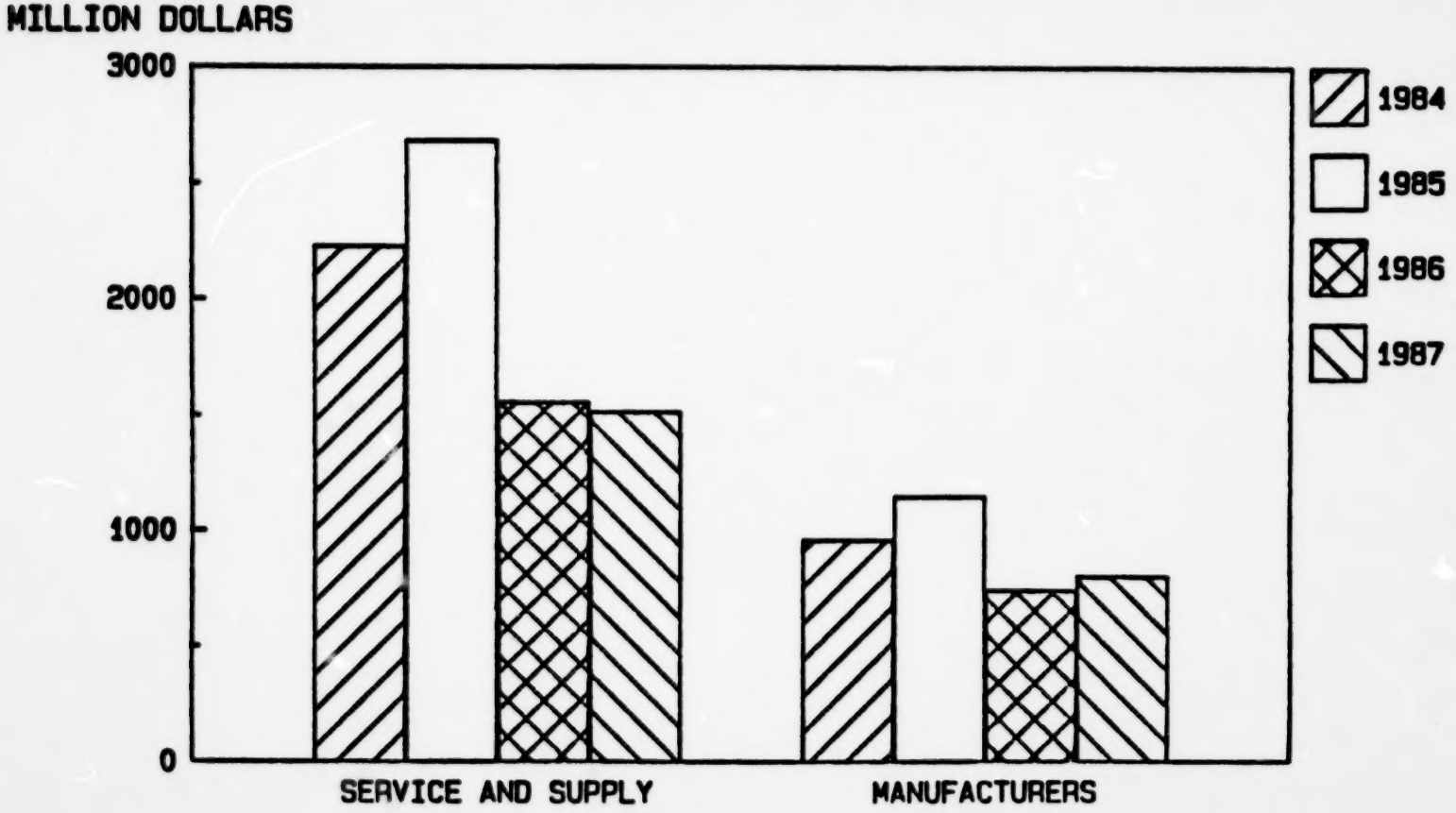
Geophysical contractors appear to have been the most severely affected although significant declines in both demand and prices were also reported by drilling and service rig contractors and related service firms. For most, diversification into other industries is not an option due to the specialized nature of their equipment and

FIGURE 7.1
DISTRIBUTION OF OPERATOR CAPITAL EXPENDITURES
IN ALBERTA: 1984-1987



Source: Tables D.4 and D.5

FIGURE 7.2
SERVICE AND SUPPLY CONTRACTOR AND MANUFACTURER ALBERTA REVENUE: 1984-1987



Source: Survey results and Tables D.9, D.10, D.11
Note: Contractor revenue from service activity in Alberta.

services. Although some interest was expressed in exporting services, few firms have made definite plans and demand levels in export markets are also perceived to be depressed and subject to increasing competition.

7.1.3 Manufacturers

Oil and gas field equipment manufacturer revenue has been affected less severely than service and supply contractor revenue but is still expected to fall 35 percent in 1986 over 1985. In contrast to the current situation, 1987 revenue from their Alberta based operations is expected to increase by 8 percent over the 1986 level to over $806 million (see Figure 7.2). Export revenue is expected to increase in 1986 and decrease only slightly in 1987. This relative optimism for 1987 is likely attributable to the fact that the manufacturers' crude oil price expectations are higher than those of the two other industry sectors. However, it must be noted that about 40 percent of respondents are uncertain as to their expected level of 1987 revenue.

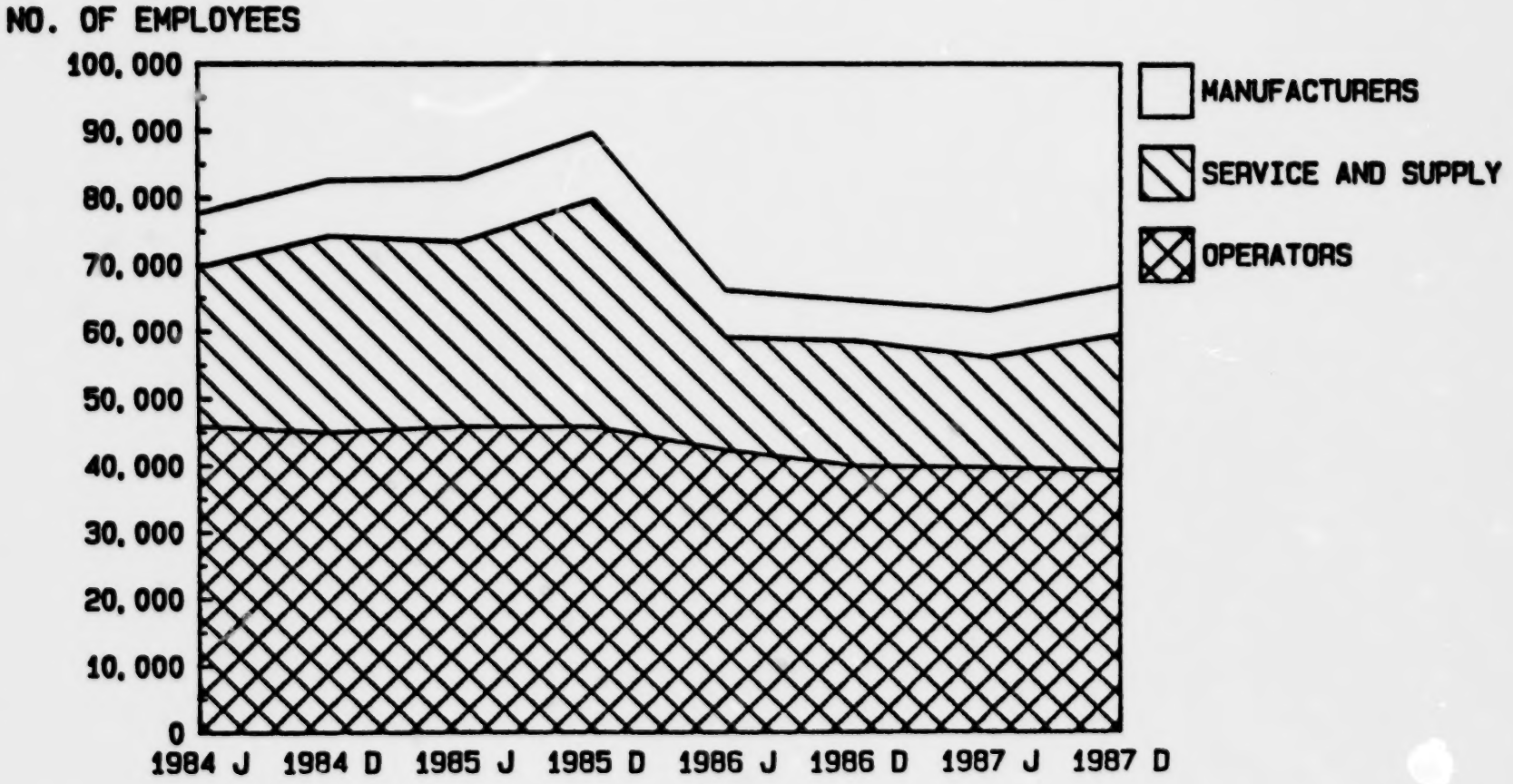
The current volume of demand facing manufacturers is reported to be down as much as 95 percent from 1985. After the high level of activity in the first quarter of 1986, demand volumes have decreased steadily. In addition, price levels have fallen 5 to 20 percent from 1985 levels. However, no further price declines are expected since firms are better to close their operations than operate below cost. Some firms are offering leasing arrangements for their equipment, rather than sales, to decrease their inventory levels and maintain some level of cash flow.

7.1.4 Employment

Operator employment in Canada is expected to decrease by more than 7,300 from December 1985 to December 1986. Since most operators are based in Alberta and most of their activity occurs in the Province, Alberta employment bears 80 percent of the employment decrease. Alberta employment declines by 5,960 from 45,850 in December 1985 to 39,890 in December 1986 (see Figure 7.3).

Service and supply contractor Alberta employment is expected to fall 45 percent from the end of 1985 to December 1986, a loss of 15,260 employees. Manufacturer Alberta employment is expected to decline by 3,760 or 38 percent from December 1985 to reach 6,050 by the end of 1986.

FIGURE 7.3
ALBERTA EMPLOYMENT BY INDUSTRY GROUP
1984-1987



Source: Table E.3

Total industry employment in Alberta falls almost 25,000 from 89,600 in December 1985 to 64,620 by year-end 1986. The service and supply contractors account for over 60 percent of this decline.

As a result of the relatively high crude oil prices expected by the service and supply contractors and manufacturers, both of these sectors expect their Alberta employment to increase in 1987. Despite the modest decrease in employment anticipated by the operators, total Alberta employment is expected to increase by 2,250 to reach 66,900 employees by December 1987.

These results underestimate the total impact on employment for two reasons. First, the survey of service and supply contractors excluded several industry groups such as oilfield trucking contractors, rig movers, oilfield construction contractors, and many oilfield consulting services. Second, these results only cover a narrow definition of direct and indirect industry employment. Other indirect employment by financial and other consulting services is excluded as well as all induced employment.

7.2 Conclusions

The dramatic decline in world oil prices in the first half of 1986 has resulted in fundamental changes in the revenue, expenditures, and employment of the various sectors of Canada's oil and gas industry. The reaction of the operators has been to cut capital expenditure plans substantially and downsize employment to a more limited degree. The larger operators in particular seem to be maintaining staff at levels higher than would be required at the current level of world oil prices. Many of these firms have simply used the depressed industry situation to eliminate less productive employees and streamline their operations. For this reason, however, further employment cuts can be anticipated, particularly by the larger operators, if crude oil prices remain at current levels. The staff reductions would occur through a combination of layoffs, attrition, and early retirements. In addition, several firms mentioned that other employment, entertainment, and travel expenses will also be cut in future unless there is an increase in crude oil prices.

The oil and gas field service and supply contractors and equipment manufacturers have reacted primarily by cutting employment, although capital expenditures have been virtually eliminated and

operating costs have been reduced considerably. There are two reasons for the greater employment cuts by these groups. First, employment costs account for the largest proportion of their total costs but for a smaller proportion of operator total costs. Second, while all groups have experienced similar percentage declines in revenue, the operators generally have an ongoing source of revenue from their operations while the revenue for the two other groups is a direct function of their activity. Given that the cuts to date have affected primarily production and field workers, if activity levels remain depressed further cuts in office and administrative staff can also be expected. However, since most firms appear to be operating with a minimum level of staff, it seems likely that any significant decreases in employment will be the result of firm closures rather than layoffs.

That more firms will close is inevitable given the current environment. The operators appear to be in the best shape financially given their ongoing source of revenue. The smaller operators as well as operators with significant debt loads seem to be relatively worse off than the larger operators. Many service and supply contractors and manufacturers will be out of business if current conditions prevail. When contacted for telephone interviews, several firms indicated that they were just closing their doors and many others reported that they would soon be out of business unless demand improved. Moreover, the excess capacity in the industry dictates bankruptcies as well as mergers. These are all the more likely given the specialized nature of the industry which seldom allows diversification into other industries. In the current environment, financial constraints are precluding many diversification plans.

The service and supply contractors and manufacturers have more optimistic crude oil price expectations than the operators. This could be attributable to a lesser knowledge of world crude oil price trends on the part of these two groups or, possibly, wishful thinking on their part. The revenue projections of the service and supply contractors and manufacturers seem to be based on their crude oil price expectations in that their revenue and employment projections are relatively optimistic, in keeping with their crude oil price expectations. This implies that if the operators' crude oil projections are in fact realized, the revenue and employment declines as well as the number of bankruptcies expected in the service and manufacturing sectors will be higher than expected. However, since the ratio of operator Alberta capital expenditures to the revenue from Alberta based operations for both groups increases significantly in 1986 and 1987 over 1984 and 1985

levels, the revenue projections could be relatively pessimistic for the expected level of crude oil prices.

In general, the supplementary interviews with service and supply contractors and manufacturers seemed to produce more pessimistic results than the telephone interviews. This is likely due to the more general nature of the personal interview questions, which gave the respondents an opportunity to express their problems and concerns. The personal interview results may also be indicative of growing pessimism in the industry since they were undertaken a few weeks after the telephone survey had begun. At least one major operator made an initial employment cut during the course of the surveys, and several others have subsequently made announcements regarding employment cuts to be made.

Despite the depressed nature of the industry, service and supply contractor and manufacturer respondents who commented on government policy issues unanimously opposed intervention in the form of incentives. These are viewed to be counter productive as they keep weaker firms operational, thereby forestalling necessary rationalization of the industry. Crude oil prices were thought to be the most important factor affecting both the service and supply contractors and the manufacturers. Thus, suggestions were made to decrease taxes and royalties on crude oil or to establish a crude oil floor price. The only suggestion for direct involvement in the manufacturing sector was a program to help manufacturers collect debts from financially troubled service and supply contractors. However, some concern was expressed by manufacturers regarding the lowering of Canadian tariffs on imports of manufactured goods.

While the survival of the oil and gas industry in Alberta does not seem to be in question, its health certainly is. The extent and the net effect of the current restructuring remain to be seen. Considerable uncertainty still prevails over even the immediate future in 1987. This is evident by the large number of firms which would not make projections for 1987 and the fact that no major changes were reported by firms which did specify 1987 figures. As the initiators of activity in the oil and gas industry, the operators were more certain of their 1987 plans and expectations, with very few firms not providing 1987 estimates. Nevertheless, this in no way indicates how confident these firms are that their expectations will be realized.

Much higher degrees of uncertainty are evident by the failure of many service and supply contractors and manufacturers to provide information regarding 1987. As a result of the difficulties faced by these sectors after the introduction of the National Energy Program in 1981, firms are making more extensive cuts more quickly to cope with the current depressed conditions. It is clear from the uncertainty and the more cautious approach of firms in all sectors of the industry that a sudden, dramatic turnaround is unlikely. Even with an upturn in activity, the losses suffered by the oil and gas industry in Alberta will require a long time to be restored.

APPENDIX A

QUESTIONNAIRES

Call 1 Date _____ Call back required ( ) Quest. No._____
Call 2 Date _____ Call back required ( ) Category _____
Call 3 Date _____ Surveyor _____

GOVERNMENT TELEPHONE SURVEY OF OPERATOR CAPITAL EXPENDITURES AND EMPLOYMENT

Good morning/afternoon. My name is _____ and I am calling on behalf of the Alberta and Federal Governments. We are collecting information on your historical and planned capital expenditures and employment to determine how they have been affected by the recent decline in world oil prices. We are calling all the major oil and gas operators in this regard. Could I please take 10 minutes of your time to answer a few questions? (If not, arrange call-back time.) If so, "Thank you" and proceed.

(If they have any concerns regarding the legitimacy of the survey, have them call Paul Precht or Gerry Protti of Alberta Energy and Natural Resources at 427-8034.)

Before we begin, could you please verify the following information regarding your company? (Note any corrections to the information.)

Name _____ Name _____

Position _____ Position _____

Company Name _____ Company Name _____

Address _____ Address _____

_____ _____

Postal Code _____ Postal Code _____

Phone No. _____ Phone No. _____

Thank you.

The questionnaire covers three general areas: employment, capital expenditures, and price and market expectations. The first two questions deal with the number of persons employed by your company **for its upstream operations only.**

Questionnaire No. ___

GOVERNMENT TELEPHONE SURVEY OF OPERATOR CAPITAL EXPENDITURES AND EMPLOYMENT

1. (a) How many full-time, part-time, and contract people did your company employ/does your company expect to employ as of: (say "currently" for June 1986)

	1984	1985	1986	1987
June 30	_____	_____	_____	_____
December 31	_____	_____	_____	_____

(b) What percentage of your total employees were part-time, seasonal, or contract employees in 1985 _____% and 1986 _____%.

(c) What percentage of your total employees were employed for your Alberta based operations in 1985 _____% and 1986 _____%.

2. You indicated that your total employment was _____ in December 1985, is _____ currently, and will be _____ at December 31, 1986.

Could you please specify the number of employees in each of the following job categories for these three periods? The categories are (name categories).

Job Category	Dec. 1985	June 1986	Dec. 1986
Managerial & Administration	_____	_____	_____
Professional & Technical	_____	_____	_____
Sales, Clerical, & Related	_____	_____	_____
Oil & Gas Field Workers	_____	_____	_____
Manufacturing, Assembling, & Repairs	_____	_____	_____
Construction Trades	_____	_____	_____
Other (specify)			
_____	_____	_____	_____
Total	_____	_____	_____

(Make sure that the figures add to the total.)

Thank you.

The next three questions are in regards to your company's capital expenditures in Canada. Capital expenditures include **upstream expenditures** on exploration and development, including production facilities. These categories are the same as those found in the annual Statistics Canada Net Cash Expenditures Survey. Please indicate your expenditures **before deducting PIP grants** and **exclude downstream expenditures** related to refining and marketing, as well as acquisitions and debt repayment (interest and principle).

3. (a) What were your company's actual/are your company's planned upstream capital expenditures in the following calendar years before deducting PIP grants:

Year	Capital Expenditures
1984	$ _____ millions
1985	$ _____ millions
1986	$ _____ millions
1987	$ _____ millions

(b) Do your total capital expenditures include any capitalized repair expenditures?

Yes ( ) No ( )

(If no, go to part c.)
(If yes, proceed.)

Please specify the amount of the capitalized repair expenditures included in total capital expenditures.

Year	Repair Expenditures
1984	$ _____ millions
1985	$ _____ millions
1986	$ _____ millions
1987	$ _____ millions

(c) Could you please specify what percentage of the total upstream capital expenditures in each year were/will be spent in the following areas before deducting PIP grants (name areas):

Area	1984	1985	1986	1987
Alberta	____ %	____ %	____ %	____ %
B.C.	____ %	____ %	____ %	____ %
Saskatchewan	____ %	____ %	____ %	____ %
Manitoba	____ %	____ %	____ %	____ %
Northern Canada	____ %	____ %	____ %	____ %
East Coast Offshore	____ %	____ %	____ %	____ %
Total	100 %	100 %	100 %	100 %

(Make sure that the figures add to 100%.)

(d) Could you now please specify how the total upstream capital expenditures in each calendar year before deducting PIP grants were/will be divided between exploration and development. Development includes development drilling, EOR, and production facilities.

Year	% on Exploration	% on Development	Total
1984	_____%	_____%	100%
1985	_____%	_____%	100%
1986	_____%	_____%	100%
1987	_____%	_____%	100%

(Make sure that the figures add to 100%.)

(e) Could you please specify the amount of land expenditures and geological and geophysical expenditures your company spent/plans to spend in the following calendar years. Land expenditures include land acquisition, rental, and retention expenditures.

Year	Land Expenditures	Geological and Geophysical Expenditures
1984	$ _____ millions	$ _____ millions
1985	$ _____ millions	$ _____ millions
1986	$ _____ millions	$ _____ millions
1987	$ _____ millions	$ _____ millions

Thank you.

The final two questions concern the price and market expectations for crude oil and natural gas that underlie the employment and capital expenditure intentions you have just specified. These estimates will help us to put your expected employment and capital expenditures into perspective.

4. (a) What average price for crude oil are your company's plans based on? (Canadian dollars per barrel at Edmonton)

- during the remainder of 1986 $ _____ Cdn./bbl.
- in 1987 $ _____ Cdn./bbl.

(b) What average price for natural gas are your company's plans based on? (Canadian dollars per thousand cubic feet at the Alberta border)

- during the remainder of 1986 $ _____ Cdn./Mcf.
- in 1987 $ _____ Cdn./Mcf.

5. How much natural gas did your company sell/does your company expect to sell in the following calendar years (thousand cubic feet per year)? Total, not just Alberta, gas sales for own account.

Year	Amount of Natural Gas Sales
1984	_____ Mcf/year
1985	_____ Mcf/year
1986	_____ Mcf/year
1987	_____ Mcf/year

Thank you very much for your time. We sincerely appreciate your cooperation with this survey.

Call 1 Date _____ Call back required ( ) Quest. No._____
Call 2 Date _____ Call back required ( ) Surveyor _____
Call 3 Date _____

GOVERNMENT TELEPHONE SURVEY OF OIL AND GAS FIELD SERVICE AND SUPPLY CONTRACTORS

Good morning/afternoon. My name is _____ and I am calling on behalf of the Alberta and Federal Governments. We are calling all the major oil and gas field service and supply contractors to determine how this sector has been affected by the recent decline in world oil prices. Could I please take 10 minutes of your time to answer a few questions? (If not, arrange call-back time.) If so, "Thank you" and proceed.

(If they have any concerns regarding the legitimacy of the survey, have them call Walter Hordowick or David Walker of Alberta Economic Development at 427-3627.)

Before we begin, could you please verify the following information regarding your company? (Note any corrections to the information.)

Name _____	Name _____
Position _____	Position _____
Company Name _____	Company Name _____
Address _____	Address _____
_____	_____
Postal Code _____	Postal Code _____
Phone No. _____	Phone No. _____

Thank you.

The questionnaire covers four general areas: the types of services offered by your company, revenue, price and market expectations, and employment. The first two questions deal with the types of services offered by your company.

1. (a) Does your company provide services to the oil and gas industry in Alberta?

Yes ( ) No ( )

(If yes) What percent of your company's 1985 revenue resulted from providing services to the oil and gas industry? _____%

(b) Does your company manufacture oil or gas field equipment in Alberta?

Yes ( ) No ( )

(If yes) What percent of your company's 1985 revenue resulted from your total manufacturing operations? _____%

(If a = No and b = No)
"Thank you for your time" and terminate interview.

(If a = Yes and b = No)
Use a service and supply contractor questionnaire.

(If a = No and b = Yes)
Use a manufacturer questionnaire.

(If a = Yes and b = Yes and % in a > % in b)
Use a service and supply contractor questionnaire.

(If a = Yes and b = Yes and % in b > % in a)
Use a manufacturer questionnaire.

Questionnaire No. ____

GOVERNMENT TELEPHONE SURVEY OF OIL AND GAS FIELD SERVICE AND SUPPLY CONTRACTORS

2. Please specify the main services currently provided by your company to the oil and gas industry (check as many services as are applicable).

( ) Aerial photography and mapping services

( ) Geophysical contract services

( ) Drilling rig contract services

( ) Service rig contract services

( ) Supply store services

Other drilling and oilfield services (specify)

( ) - logging
( ) - testing
( ) - coring
( ) - well stimulation
( ) - cementing
( ) - trucking
( ) - oilfield construction
( ) - mud
( ) - other (specify) _____
( ) - other (specify) _____

Thank you.

The next two questions concern your company's revenue. Please **exclude** revenue from out-of-province subsidiaries.

3. (a) What was your company's total revenue in calendar year 1984 and 1985?

1984 $ _____ thousands
1985 $ _____ thousands

(b) What percentage of your total calendar year 1984 and 1985 revenue was from service activity in Alberta? 1984 _____%
1985 _____%

(c) What percentage of your total calendar year 1984 and 1985 revenue was from each of the following types of services (name types)?

Type of Service	1984	1985
Aerial photography and mapping	____%	____%
Geophysical contract	____%	____%
Drilling rig	____%	____%
Service rig	____%	____%
Supply store	____%	____%
Other drilling and oilfield	____%	____%
Other (specify) _____	____%	____%
Total	100 %	100 %

(Make sure that the figures add to 100%.)

4. (a) Do you expect your company's total revenue to increase, decrease, or stay about the same in the following calendar years:

- 1986 over 1985: increase ( ) decrease ( ) same ( )

- 1987 over 1986: increase ( ) decrease ( ) same ( )

(If "same" for both years, go to question 5.)
(If increase or decrease for either year, proceed.)

(b) What percentage increase/decrease do you expect in calendar year:

1986 over 1985 _____%
1987 over 1986 _____%

Thank you.

The next four questions deal with your company's price and market expectations regarding oil and gas field service exports and imports, and crude oil prices.

5. (a) Did your company export any oil or gas field services **from your Alberta based operations** to countries outside Canada in calendar year 1984 or 1985?

Yes ( ) No ( )

(If no, go to question 6.)
(If yes, proceed.)

What was your company's revenue from exporting oil and gas field services **from your Alberta based operations** in calendar year 1984 and 1985?

1984 $ _____ thousands
1985 $ _____ thousands

(b) What percentage of your total calendar year 1984 and 1985 revenue from exporting oil and gas field services **from your Alberta based operations** was from each of the following types of services (name types)?

Type of Service	1984	1985
Aerial photography and mapping	_____ %	_____ %
Geophysical contract	_____ %	_____ %
Drilling rig	_____ %	_____ %
Service rig	_____ %	_____ %
Supply store	_____ %	_____ %
Other drilling and oilfield	_____ %	_____ %
Total	100 %	100 %

(Make sure that the figures add to 100%.)

(c) Do you expect your company's revenue from exporting oil and gas field services **from your Alberta based operations** to increase, decrease, or stay about the same in the following calendar years:

- 1986 over 1985: increase ( ) decrease ( ) same ( ).

- 1987 over 1986: increase ( ) decrease ( ) same ( ).

(If "same" for both years, go to Question 7.)
(If increase or decrease for either year, proceed.)

(d) What percentage increase/decrease do you expect in calendar year:

1986 over 1985 _____%
1987 over 1986 _____%

(Go to Question 7.)

6. Does your company plan to export oil or gas field services from your Alberta based operations in calendar year 1986 or 1987?

   Yes ( ) No ( )

7. (a) Does your company expect a change between now and the end of 1987 in the level of competition in your Canadian market from imports of oil or gas field services?

   Yes ( ) No ( ) No Opinion ( )

   (If no or no opinion, go to question 8.)
   (If yes, proceed.)

   (b) Do you expect the level of competition to increase or decrease?

   Increase ( ) Decrease ( )

   (c) What effect will this have on your company's Alberta based operations?

   Significant effect ( ) Moderate effect ( )

   Small to no effect ( )

8. What average price does your company expect for crude oil during the remainder of 1986 and in 1987 (U.S. dollars per barrel)? The current price is $ _____.

   - during the remainder of 1986 $ _____ U.S./bbl
   - in 1987 $ _____ U.S./bbl

Thank you.

The last two questions deal with the number of persons employed by your company for your Alberta based operations.

9. (a) How many full-time and part-time people did your company employ/does your company expect to employ for your Alberta based operations as of: (say "currently" for June 1986)

	1984	1985	1986	1987
June 30				
December 31				

   (b) What percentage of your employees for your Alberta based operations were part-time or seasonal employees in
   1985 _____% and
   1986 _____%.

10. You indicated that your total employment for your Alberta based operations was _____ in December 1985, is _____ currently, and will be _____ at December 31, 1986.

    Could you please specify the number of employees in each of the following job categories for these three periods? The categories are (name categories).

Job Category	Dec. 1985	June 1986	Dec. 1986
Managerial & Administration	_____	_____	_____
Professional & Technical	_____	_____	_____
Sales, Clerical, & Related	_____	_____	_____
Oil & Gas Field Workers	_____	_____	_____
Manufacturing, Assembling, & Repairs	_____	_____	_____
Construction Trades	_____	_____	_____
Other (specify) _____	_____	_____	_____
Total	_____	_____	_____

(Make sure that the figures add to the total.)

Thank you very much for your time. We sincerely appreciate your cooperation with this survey.

Call 1 Date _____ Call back required ( ) Quest. No._____
Call 2 Date _____ Call back required ( ) Surveyor _____
Call 3 Date _____

GOVERNMENT TELEPHONE SURVEY OF OIL AND GAS FIELD EQUIPMENT MANUFACTURERS

Good morning/afternoon. My name is _____ and I am calling on behalf of the Alberta and Federal Governments. We are calling all the major oil and gas field equipment manufacturers to determine how this sector has been affected by the recent decline in world oil prices. Could I please take 10 minutes of your time to answer a few questions? (If not, arrange call-back time.) If so, "Thank you" and proceed.

(If they have any concerns regarding the legitimacy of the survey, have them call Walter Hardowick or David Walker of Alberta Economic Development at 427-3627.)

Before we begin, could you please verify the following information regarding your company? (Note any corrections to the information.)

Name _____	Name _____
Position _____	Position _____
Company Name _____	Company Name _____
Address _____	Address _____
_____	_____
Postal Code _____	Postal Code _____
Phone No. _____	Phone No. _____

Thank you.

The questionnaire covers four general areas: the type of equipment manufactured by your company, revenue, price and market expectations, and employment. The first two questions deal with the type of equipment manufactured by your company.

1. (a) Does your company provide services to the oil and gas industry in Alberta?

Yes ( ) No ( )

(If yes) What percent of your company's 1985 revenue resulted from providing services to the oil and gas industry? _____%

(b) Does your company manufacture oil or gas field equipment in Alberta?

Yes ( ) No ( )

(If yes) What percent of your company's 1985 revenue resulted from your total manufacturing operations? _____%

(If a = No and b = No)
"Thank you for your time" and terminate interview.

(If a = Yes and b = No)
Use a service and supply contractor questionnaire.

(If a = No and b = Yes)
Use a manufacturer questionnaire.

(If a = Yes and b = Yes and % in a > % in b)
Use a service and supply contractor questionnaire.

(If a = Yes and b = Yes and % in b > % in a)
Use a manufacturer questionnaire.

Questionnaire No.____

GOVERNMENT TELEPHONE SURVEY OF OIL AND GAS FIELD EQUIPMENT MANUFACTURERS

2. (a) What type of manufacturing did the majority of your 1985 revenue come from (name types--check **one** only)?

Metal fabricating	( )
Machinery	( )
Transportation Equipment	( )
Electronics	( )
Other (specify) _____	( )

(b) Does your company manufacture:

Exploration or Predrill Equipment? Yes ( ) No ( )

Specify main products: _____

_____

_____

Drilling, Completion, or Well Service Equipment? Yes ( ) No ( )

Specify main products: _____

_____

_____

Production Equipment? Yes ( ) No ( )

Specify main products: _____

_____

_____

Thank you.

The next two questions concern your company's revenue.

3. (a) What was your company's total revenue in calendar year 1984 and 1985?

1984 $ _____ thousands
1985 $ _____ thousands

(b) What percentage of your total calendar year 1984 and 1985 revenue was from your Alberta based operations?

1984 _____%
1985 _____%

(c) What percentage of your total calendar year 1984 and 1985 revenue **from your Alberta based operations** was from each of the following types of equipment (name types)?

Type of Equipment	1984	1985
Exploration and Predrill Equipment	____%	____%
Drilling, Completion, and Well Service Equipment	____%	____%
Production Equipment	____%	____%
Other (specify) _____	____%	____%
Total	100 %	100 %

(Make sure that the figures add to 100%.)

4. (a) Do you expect your company's revenue **from your Alberta based operations** to increase, decrease, or stay about the same in the following calendar years:

- 1986 over 1985: increase ( ) decrease ( ) same ( ).

- 1987 over 1986: increase ( ) decrease ( ) same ( ).

(If "same" for both years, go to Question 5.)
(If increase or decrease for either year, proceed.)

(b) What percentage increase/decrease do you expect in calendar year:

1986 over 1985 _____%
1987 over 1986 _____%

Thank you.

The next four questions deal with your company's price and market expectations regarding product exports and imports, and crude oil prices.

5. (a) Did your company export any oil or gas field equipment **from your Alberta based operations** to countries outside Canada in calendar year 1984 or 1985?

Yes ( ) No ( )

(If no, go to question 6.)
(If yes, proceed.)

What was your company's revenue from exporting oil or gas field equipment **from your Alberta based operations** in calendar year 1984 and 1985?

1984 $ _____ thousands
1985 $ _____ thousands

(b) What percentage of your total calendar year 1984 and 1985 revenue from exporting oil or gas field equipment **from your Alberta based operations** was from each of the following types of equipment (name types)?

Type of Equipment	1984	1985
Exploration and Predrill Equipment	____%	____%
Drilling, Completion, and Well Service Equipment	____%	____%
Production Equipment	____%	____%
Other (specify) _____	____%	____%
Total	100 %	100 %

(Make sure that the figures add to 100%.)

(c) Do you expect your company's revenue from exporting oil and gas field equipment **from your Alberta based operations** to increase, decrease, or stay about the same in the following calendar years:

- 1986 over 1985: increase ( ) decrease ( ) same ( ).
- 1987 over 1986: increase ( ) decrease ( ) same ( ).

(If "same" for both years, go to Question 7.)
(If increase or decrease for either year, proceed.)

(d) What percentage increase/decrease do you expect in calendar year:

1986 over 1985 _____%
1987 over 1986 _____%

(Go to Question 7.)

6. Does your company plan to export oil or gas field equipment in calendar year 1986 or 1987 **from your Alberta based operations?**

   Yes ( ) No ( )

7. (a) Does your company expect a change between now and the end of 1987 in the level of competition in your Canadian market from **imports** of oil or gas field equipment?

   Yes ( ) No ( ) No Opinion ( )

   (If no or no opinion, go to question 8.)
   (If yes, proceed.)

   (b) Do you expect the level of competition to increase or decrease?

   Increase ( ) Decrease ( )

   (c) What effect will this have on your company's Alberta based operations?

   Significant effect ( ) Moderate effect ( )

   Small or no effect ( )

8. What average price does your company expect for crude oil during the remainder of 1986 and in 1987 (U.S. dollars per barrel)? The current price is $ _____.

   - during the remainder of 1986 $ _____ U.S./bbl.
   - in 1987 $ _____ U.S./bbl.

Thank you.

The last two questions deal with the number of persons employed by your company **for your Alberta based operations.**

9. (a) How many full-time and part-time people did your company employ/does your company expect to employ for your Alberta based operations as of: (say "currently" for June 1986)

	1984	1985	1986	1987
June 30	_____	_____	_____	_____
December 31	_____	_____	_____	_____

   (b) What percentage of your employees for your Alberta based operations were part-time or seasonal employees in
   1985 _____% and
   1986 _____%.

10. You indicated that your employment for your Alberta based operations was _____ in December 1985, is _____ currently, and will be _____ at December 31, 1986.

Could you please specify the number of employees in each of the following job categories for these three periods? The categories are (name categories).

Job Category	Dec. 1985	June 1986	Dec. 1986
Managerial & Administration			
Professional & Technical			
Sales, Clerical, & Related			
Oil & Gas Field Workers			
Manufacturing, Assembling, & Repairs			
Construction Trades			
Other (specify)			
_____			
Total			

(Make sure that the figures add to the total.)

Thank you very much for your time. We sincerely appreciate your cooperation with this survey.

Date _____
Interviewer _____

OPERATOR SUPPLEMENTARY TELEPHONE INTERVIEW QUESTIONNAIRE

Company Name _____ Quest. No. _____
Contact Person _____ Position _____

OPERATOR SUPPLEMENTARY TELEPHONE INTERVIEW QUESTIONNAIRE

1. Please confirm employment figures previously specified for 1986 and 1987. (Record figures that are different from earlier results only beside those figures.)

2. (a) Please discuss the reasons for the net change in employment between 1985 and 1986 (e.g., lower oil prices, change in type of activity, change in focus of company).

_____

_____

_____

_____

_____

_____

_____

(b) Is any of this net change due to seasonal impacts? Yes ( ) No ( )
If so, will the full complement of seasonal employees be rehired in your high season? Yes ( ) No ( ) Discuss.

_____

_____

(c) Which of the following employment measures have been taken by your company in 1986 to result in this net change in employment? Specify the number of employees affected by each measure.

Measures	Number of Employees
( ) Lay offs	_____
( ) Early retirement	_____
( ) Attrition	_____
( ) Hiring	_____
( ) Other (specify) _____	_____
( ) Other (specify) _____	_____

Discuss the nature and extent of each policy measure taken (see notes).

_____

_____

_____

_____

_____

_____

_____

(d) Which of the following additional employment policy measures have been taken by your company in 1986? Specify the number of employees affected by each measure.

Measures	Number of Employees
( ) Increasing part-time staff	_____
( ) Work sharing	_____
( ) Pay cuts	_____
( ) Other benefit cuts	_____
( ) Other (specify) _____	_____
( ) Other (specify) _____	_____

Discuss the nature and extent of each policy measure taken (see notes).

_____

_____

_____

_____

_____

_____

_____

_____

(e) How is the workload being redistributed among your employees? (e.g., are senior people covering for junior positions that have been terminated?)

_____

_____

_____

_____

_____

(f) How have these measures affected your company's Alberta operations? (e.g., Have your Alberta operations borne a greater or lesser portion of the decreases relative to your total Canadian operations? Have Northern Alberta operations been affected more or less than those of Southern Alberta?)

_____

_____

_____

_____

_____

_____

_____

3. (a) Discuss likely future employment policies. Under what price and market conditions would you change your current employment policies?

(b) What kind of employment policy changes would you make under these conditions (e.g., cancelling early retirement programs, lifting hiring freezes, etc.)? Which changes would be implemented first? How long would it take to implement these changes?

(c) Will your plans include hiring? Yes ( ) No ( ) If so, what categories of employees would be hired?

(d) Would you rehire laid off workers ( ) or hire others ( )? If different workers would be hired, how would these people differ from your former employees (e.g., more junior people)?

(e) Would your company's employment structure change? Yes ( ) No ( ) If so, how? (e.g., greater proportion of management, more contract or part-time employees, more professionals, etc.)

DISCUSSION OF EMPLOYMENT POLICY MEASURES

Lay-offs:

- which categories (types) of employees have been affected?
- are any of the laid-off employees being replaced with newly hired workers? If so, are these full-time, part-time, or contract employees? What is the advantage of these people over those laid-off?

Early Retirement:

- how has your retirement policy changed?
- for programs which are not mandatory:
  - which categories (types) of employees have taken advantage of the policy?
- are any retiring employees being replaced with newly hired workers? If so, are these people full-time, part-time, or contract?

Attrition:

- which categories (types) of employees are not being replaced?

Hiring:

- which categories (types) of employers are being hired?
- are these employees replacing employees who have left the company or are they filling newly created positions?
- are their salaries lower or higher than they would have been previous to 1986?
- are these employees being hired on a permanent, contract, or part-time basis?

Increasing Part-time Staff:

- what categories (types) of employees are affected?
- are new part-time staff replacing laid off or retired full-time staff?
- are previously full-time employees now only working part-time?

Working Sharing:

- what categories (types) of employees are affected?
- how long is the new work week?
- is the reduction in pay commensurate with or greater than the reduction in hours?

Pay Cuts:

- what categories (types) of employees are affected?
- what is the average percentage reduction?
- are the cuts uniform in percentage terms for all categories of employees affected?

Other Benefit Cuts:

- what categories (types) of employees are affected?
- what benefits have been reduced or eliminated (e.g, cars, club memberships)?
- are the cuts uniform for all categories of employees affected?

Date: _____
Interviewer: _____

SERVICE AND SUPPLY CONTRACTOR PERSONAL INTERVIEW QUESTIONNAIRE

I. COMPANY INFORMATION

1. Company Name _____ Questionnaire No. ____

Contact Person _____ Position _____

Type of Services (a) _____

(b) _____

Revenue: 1984$ _____ thousands

1985$ _____ thousands

Exporter: Yes ( ) No ( )

Employees: Dec./85 _____ Dec./86 _____

II. CURRENT MARKET SITUATION

1. Demand (on the basis of volume, excluding price considerations)

(a) Describe the current demand for the service(s) you provide and compare it to the demand in 1985? Please specify any differences among types of service.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(b) What level of demand for your service(s) do you expect for the remainder of 1986? In 1987?

What are the most important factors that will determine the demand for your service(s) between now and the end of 1987?

(c) Is the demand for your services(s) seasonal? Yes ( ) No ( ) If so, when are your normal peak and low periods?

(d) Do you plan to (continue to) export your service(s) in the remainder of 1986? Yes ( ) No ( ) In 1987? Yes ( ) No ( ) What type(s) of services will you export?

Geographically, what export markets are you aiming for? What is the demand situation for your service(s) in these markets (e.g., stable, increasing, decreasing)?

Are you interested in government assistance in selling to export markets? Yes ( ) No ( ) If so, what specific type of assistance is required in each market? (Discuss in relation to awareness of existing programs and whether or not these are seen to be satisfactory)

2. Supply

(a) What is the current supply/capacity situation for the services you provide, particularly in regard to any over/under supply, inventory/equipment surplusses/shortages?

How does the current supply/capacity situation for your service(s) compare to the supply/capacity situation in 1985?

How do you expect the current supply/capacity situation to change in the remainder of 1986? In 1987?

(b) Do you expect a change in the number of suppliers in the remainder of 1986? Yes ( ) No ( ) In 1987? Yes ( ) No ( ) (Specify the direction and types of changes. For example, mergers or bankruptcies.)

(c) Do you expect an increase ( ) or a decrease ( ) in the level of competition in your Canadian market from imports? If so, specify from which countries and why. If not, go to Question 3.

Specify what effect this will have on your company.

3. Price

(a) Is the current market price for your service(s) different from the 1985 price? Yes ( ) No ( ) If so, by how much?

What price level do you expect by the end of 1986? By the end of 1987?

What is the effect of these price changes on your profit margins?

(b) How closely does the price of your service(s) respond to changes in the level of activity in terms of both how quickly and how much it changes? (Note any differences between upside and downside changes.)

III. REACTION TO CURRENT MARKET SITUATION

1. Operating Costs

(a) Has your company taken or is your company planning to take any measures to reduce operating costs in reaction to the current market situation? Yes ( ) No ( ) If so, please specify the measures taken or to be taken.

_____

_____

_____

_____

_____

(b) Has your employment level been affected beyond any normal seasonal change? Yes ( ) No ( ) If so, which of the following measures have been taken (excluding measures taken in response to seasonal impacts)? Please estimate the number of employees affected by each measure.

Measures	Number of Employees
( ) Increasing part time staff	_____
( ) Layoffs	_____
( ) Work sharing	_____
( ) Early retirement	_____
( ) Attrition	_____
( ) Pay or benefit cuts	_____
( ) Other (specify) _____	_____
( ) Other (specify) _____	_____

(c) Describe the nature and extent of each measure (see notes).

_____

_____

_____

_____

_____

2. Capital Expenditures

(a) Has your company taken or is your company planning to take any measures to reduce capital expenditures in reaction to the current market situation? Yes ( ) No ( ) If so, please specify the measures taken or to be taken, including cancellation of previously planned capital expenditures.

_____

_____

_____

_____

_____

(b) If assets are being sold, either by your company or in your industry, how do resale prices compare with asset value?

(c) Does your company have any planned investment or capital expenditures? Yes ( ) No ( ) Is bank or other financing a constraint?

3. Diversification

(a) Is your company planning any changes to the range of service(s) that you currently provide in reaction to the current situation? Yes ( ) No ( ) If so, please specify if this will involve specialization, diversification, new services? If not, go to Question 4.

(b) Which service markets are you considering and why? What is the current and expected demand situation for these services?

4. Timing

(a) Are the measures being taken by your company in reaction to the current market situation considered to be temporary ( ) or permanent ( )? Under what price and market conditions would you change these policies?

(b) If market conditions improve, how do you expect your company to respond? (For example, by hiring or making capital expenditures.)

(c) What are the major difficulties foreseen by your company over the next two years? (e.g., market demand, cash flow, debt, etc.)

IV. OTHER COMMENTS

Date: _____
Interviewer: _____

MANUFACTURER PERSONAL INTERVIEW QUESTIONNAIRE

I. COMPANY INFORMATION

1. Company Name _____ Questionnaire No. ____

   Contact Person _____ Position _____

   Type of Manufacturing _____

   Type of Equipment _____

   Revenue: 1984$ _____ thousands

   1985$ _____ thousands

   Exporter: Yes ( ) No ( )

   Employees: Dec./85 _____ Dec./86 _____

II. CURRENT MARKET SITUATION

1. Demand (on the basis of volume, excluding price considerations)

   (a) Describe the current demand for the product(s) you manufacture and compare it to the demand in 1985? Please specify any differences among product groups (exploration and predrill; drilling, completion, and well service; and production).

_____

_____

_____

_____

_____

_____

_____

_____

_____

(b) What level of demand for your product(s) do you expect for the remainder of 1986? In 1987?

What are the most important factors that will determine the demand for your product(s) between now and the end of 1987?

(c) Is the demand for your product(s) seasonal? Yes ( ) No ( ) If so, when are your normal peak and low periods?

(d) Do you plan to (continue to) export your product(s) in the remainder of 1986? Yes ( ) No ( ) In 1987? Yes ( ) No ( ) What type(s) of products will you export?

Geographically, what export markets are you aiming for? What is the demand situation for your product(s) in these markets (e.g., stable, increasing, decreasing)?

Are you interested in government assistance in selling to export markets? Yes ( ) No ( ) If so, what specific type of assistance is required in each market? (Discuss in relation to awareness of existing programs and whether or not these are seen to be satisfactory).

2. Supply

(a) What is the current supply/capacity situation for the products you manufacture, particularly in regard ro any over/under supply, inventory/equipment surplusses/shortages?

How does the current supply/capacity situation for your product(s) compare to the supply/capacity situation in 1985?

How do you expect the current supply/capacity situation to change in the remainder of 1986? In 1987?

(b) Do you expect a change in the number of suppliers in the remainder of 1986? Yes ( ) No ( ) In 1987? Yes ( ) No ( ) (Specify the direction and types of changes. For example, mergers or bankruptcies.)

(c) Do you expect an increase ( ) or a decrease ( ) in the level of competition in your Canadian market from imports? If so, specify from which countries and why. If not, go to Question 3.

Specify what effect this will have on your company.

3. Price

(a) Is the current market price for your product(s) different from the 1985 price? Yes ( ) No ( ) If so, by how much?

What price level do you expect by the end of 1986? By the end of 1987?

What is the effect of these price changes on your profit margins?

(b) How closely does the price of your product(s) respond to changes in the level of activity in terms of both how quickly and how much it changes? (Note any differences between upside and downside changes.)

III. REACTION TO CURRENT MARKET SITUATION

1. Operating Costs

(a) Has your company taken or is your company planning to take any measures to reduce operating costs in reaction to the current market situation? Yes ( ) No ( ) If so, please specify the measures taken or to be taken.

_____

_____

_____

_____

_____

(b) Has your employment level been affected beyond any normal seasonal change? Yes ( ) No ( ) If so, which of the following measures have been taken (excluding measures taken in response to seasonal impacts)? Please estimate the number of employees affected by each measures.

	Measures	Number of Employees
( )	Increasing part time staff	_____
( )	Layoffs	_____
( )	Work sharing	_____
( )	Early retirement	_____
( )	Attrition	_____
( )	Pay cuts or benefit cuts	_____
( )	Other (specify) _____	_____
( )	Other (specify) _____	_____

(c) Describe the nature and extent of each measure (see notes).

_____

_____

_____

_____

_____

2. Capital Expenditures

(a) Has your company taken or is your company planning to take any measures to reduce capital expenditures in reaction to the current market situation? Yes ( ) No ( ) If so, please specify the measures taken or to be taken, including cancellation of previously planned capital expenditures.

_____

_____

_____

_____

_____

(b) If assets are being sold either by your company or in your industry, how do resale prices compare with asset value?

(c) Does your company have any planned investment or capital expenditures? Yes ( ) No ( ) Is bank or other financing a constraint?

3. Diversification

(a) Is your company planning any changes to the range of products that you currently manufacture in reaction to the current situation? Yes ( ) No ( ) If so, please specify if this will involve specialization, diversification, new products? If not, go to Question 4.

(b) Which product markets are you considering and why? What is the current and expected demand situation for these products?

4. Timing

(a) Are the measures being taken by your company in reaction to the current market situation considered to be temporary ( ) or permanent ( )? Under what price and market conditions would you change these policies?

(b) If market conditions improve, how do you expect your company to respond? (For example, by hiring or making capital expenditures.)

(c) What are the major difficulties foreseen by your company over the next two years? (e.g., market demand, cash flow, debt, etc.)

IV. OTHER COMMENTS

APPENDIX B

SURVEY METHODOLOGY AND EXPANSION PROCEDURES

Appendix B

SURVEY METHODOLOGY AND EXPANSION PROCEDURES

Determining the impact of lower oil and gas prices on the oil and gas industry requires detailed information from the firms involved in the industry. Thus, a survey methodology was employed to collect the requisite industry data. This appendix outlines the survey procedures employed, the resulting response, and how the survey results were expanded to estimate the total industry.

B.1 Survey Methodology

B.1.1 Determination of Survey Population

A survey's target population is derived from an initial list of firms by deleting firms that are not relevant to the analysis. In this study, the initial list of operators was compiled by the consultants from four sources; the Canadian Petroleum Association regular members list, the Independent Petroleum Association of Canada regular members list, the Small Explorers and Producers Association of Canada membership list, and several firms not on any of the above lists but which ranked among the top Canadian oil or gas producers in 1985. The result was a comprehensive list of all major oil and gas operators in Canada and most small operators.

The list of operators was divided into four groups by Alberta Energy and Natural Resources according to the type and level of activity of each firm. The categorization of a given firm as an integrated, senior, intermediate, or junior operator was confirmed or changed according to the questionnaire responses provided by that firm. Integrated operators include those with refining operations. The remaining operator groups were identified by their 1985 levels of capital expenditures, employment, and annual natural gas sales. In general, senior operators have a minimum of $100 million in annual capital expenditures, 200 employees, and 15 billion cubic feet of natural gas sales. Junior operators generally have a maximum of $10 million in annual capital expenditures, 20 employees, and 3 million cubic feet of natural gas sales. The intermediate operators generally

fall between the criteria for the senior and junior operators. In some cases, the placement of a firm in a given operator group was changed on the basis of its survey results.

Lists of Alberta service and supply contractors and manufacturers were provided by Alberta Economic Development. The manufacturers list was deemed to be comprehensive of that industry group based on a survey commissioned by that department in 1984. The service and supply contractor list was considered a sufficient sample of the industry, though not a complete list of all firms. Several firms were reclassified between the service and supply contractor and the manufacturer lists based on their responses to the questionnaire.

Given the nature of the firm lists employed in the survey, the target population constitutes a non-random sample of the universe or industry population of operators and service and supply contractors. The manufacturers list was considered to be a census listing.

In addition to the quantitative information to be provided by firms in the target population, qualitative information was obtained from 100 firms in supplementary interviews. The information collected from operators was in regards to employment issues relevant primarily to larger firms. Thus, all of the integrated producers, approximately three-quarters of the senior producers, and five each of the intermediate and junior producers constitute the target population for the operator supplementary telephone interviews (see Table B.1).

The target population for the service and supply contractor and manufacturer personal interviews was derived so as to obtain a cross section of firms according to several criteria:

- exporters/non-exporters;
- Calgary/Edmonton/other Alberta based;
- Canadian/foreign owned;
- small/medium/large; and
- various manufacturing/service types.

Preliminary lists provided by Alberta Economic Development were augmented to comprise the entire target population listed in Table B.2.

TABLE B.1

OPERATOR SUPPLEMENTARY TELEPHONE INTERVIEWS

1. INTEGRATED COMPANIES:

Chevron Canada Resources Ltd.
Esso Resources Canada Ltd.
Husky Oil Limited
Petro-Canada, Inc.
Shell Canada Resources Ltd.
Suncor Inc.
Texaco Canada Resources Ltd.

2. SENIOR PRODUCERS:

Aberford Resources Ltd.
Amoco Canada Petroleum Co. Ltd.
BP Canada Inc.
Bow Valley Industries Ltd.
Canadian Hunter Explorations Ltd.
Canterra Energy Limited
Dome Petroleum Limited
Gulf Canada Resources Inc.
Home Oil Company Limited
Mobil Oil Canada Ltd.
Murphy Oil Company
Norcen Energy Resources Ltd.
Syncrude Canada Ltd.
Unocal Canada Ltd.
Westcoast Petroleum

3. INTERMEDIATE PRODUCERS:

CN Exploration Inc.
Co-Enerco
Omega Hydrocarbons Ltd.
PreCambrian Shield Resources Ltd.
Total Petroleum Canada Ltd.
Tricentrol Oils Ltd.

4. JUNIOR PRODUCERS:

Bralorne Resources Ltd.
Carlyle Energy Ltd.
Dorset Energy Corp.
First Calgary Petroleums Ltd.
Petrol Properties Ltd.
Prophet Petroleums Ltd.

TABLE B.2

SERVICE AND SUPPLY CONTRACTOR AND MANUFACTURER
PERSONAL INTERVIEWS

SERVICE AND SUPPLY CONTRACTORS:

AMF Tuboscope
ADECO Drilling and Engineering Co. Ltd.
AGAT Laboratories Ltd.
Airborne Geophysical Surveys Ltd.
B.G.H. Gas Test Operating Ltd.
B.W. Rig Repair and Supply
Baker Oil Tools Canada
Beaver Drilling Ltd.
Beaver Geophysical Services
Bocam Drilling Ltd.
Canadian Formation Testers Ltd.
Canadian Fracmaster Ltd.
Chemex Labs Ltd.
Circle T Service and Rental Ltd.
Computalog Gearhart Ltd.
Cool Well Service Ltd.
Covell Firefighting Ltd.
Crown Caterers (Div. of Bralorne Resources)
Crown Well Servicing Ltd.
D & S Petroleum Consulting Group
Entertec Geophysical Services Ltd.
Four M Oilfield Services Ltd.
Gale Resources Ltd.
Grant Geophysical Ltd.
Kenting Drilling Co. Ltd.
Loffland Brothers Co. of Canada
Mega Engineering Ltd.
Nowsco Well Service Ltd.
OPI Ltd.
Schlumberger of Canada
Slurry Cementers Ltd.
Sonics Exploration Ltd.
Terroco Industries Ltd.

MANUFACTURERS:

ABAX Energy Services
Alberta Oil Tool (Div. of Dover Corp.)
Ampscot Equipment Ltd.
Argo Sales Ltd.
Axelson Industries Ltd.

MANUFACTURERS: (Cont'd.)

Beta Monitors & Controls Ltd.
CRC Wellhead Supply Ltd.
C.E. Natco Ltd.
C.R. Electronics Ltd.
Cameron Iron Works of Canada Ltd.
Canterra Engineering Ltd.
Curtis Hoover Ltd.
Devcan Machine & Manufacturing
Dominion Bridge
Dreco Energy Services Ltd.
Enerflex Systems Ltd.
George and Nicks Machine Works Ltd.
Goldec International Equipment Inc.
Griffith Oil Tool Ltd.
Legrand Industries Ltd.
Lurkin Industries Canada Ltd.
Newarke Oil Pumps Inc.
Nor'West Controls Canada Inc.
Porta-Test Systems Ltd.
Presson Manufacuturing Ltd.
Propak Systems Ltd.
Rockbit Industries of Canada (1985) Ltd.
Select Oil Tool Ltd.
Sparrow Electric Co. Ltd.
Strathcona Steel Manufacturing Inc.
Universal Industries Ltd.
Western Rockbit Co. Ltd.
Westronic Systems Ltd.

B.1.2 Questionnaire Design and Pretest

A separate telephone interview questionnaire was developed for each industry group (see Appendix A). The operators questionnaire covered three general areas; employment, capital expenditures, and price and market expectations. Land expenditures and geological and geophysical expenditures were specified separately to allow for comparison of the capital expenditures data with national accounts data. The service and supply contractor and manufacturer questionnaires each covered four general areas; the types of services offered/ equipment manufactured, revenue, price and market expectations, and employment. Each questionnaire was pretested over the telephone with several firms from the corresponding industry group. Input from the pretests was used to clarify questions and instructions and to determine the viability of collecting the requisite information over the telephone.

The operator supplementary interviews concentrated on employment issues only and, therefore, were administered over the telephone. These interviews examined the nature and extent of employment measures taken in 1986 and the reasons for those measures. This questionnaire was also pretested over the telephone and subsequently revised.

The qualitative information required from service and supply contractors and manufacturers necessitated a personal interview as several areas were covered as follows:

- current situation
  - demand
  - supply
  - price

- reaction to current situation
  - operating costs
  - capital expenditures
  - diversification
  - timing

These questionnaires were finalized after in-person pretests with both industry groups.

B.1.3 Questionnaire Administration

The telephone questionnaires were administered over a 7-week period from the end of May to the middle of July 1986. The contact person was generally a president or vice-president to ensure that quality information was received.

In some cases where the firm declined to respond over the telephone, a copy of the questionnaire was mailed out and the response obtained either over the telephone or through the mail. In some cases where a service and supply contractor or a manufacturer refused to provide revenue figures, a 1984 figure was provided by Alberta Economic Development based on a previous survey. Questions which were not or could not be answered by a respondent were specially coded to distinguish them from a zero response.

Each questionnaire response was individually examined to ensure that the questions were correctly answered and that the answers were both technically correct (e.g., that the totals added) and internally consistent (e.g., an appropriate number of employees for a given level of capital expenditures or revenue). All cases with questionable numbers were contacted again to clarify and/or correct the responses.

The questionnaire data were entered into a dBASE III database using a program which provided error checks on the data entry.

B.2 Survey Response Rates

The initial list of operators was reduced by firms that were out of business, firms that had no upstream operations, and firms that were consultants to the industry without any direct involvement of their own. Thus, the initial list of 326 operators was reduced to a target population of 288 firms. Of that total, 10 firms refused to answer the questionnaire and 1 firm could not be contacted. The 277 respondents result in a 96 percent response rate for the operators.

The initial list of 561 service and supply contractors and manufacturers was reduced by firms that were out of business, currently inactive or that do not provide services or manufacture equipment for the oil and gas industry. In addition, manufacturers initially on the service and supply contractor list were transferred to the correct list, and vice versa. The appropriate classification was determined both by the type of activity each firm was involved in and the

percentage of their 1985 revenue from that activity. No minimum percentage of revenue was required for firms involved in only one activity.

The remaining 494 firms comprise the target population. Of these, 20 refused to answer the questionnaire and 4 could not be contacted. The 470 respondents constitute a response rate of 95 percent for both the service and supply contractors and the manufacturers. Table B.3 outlines the total telephone survey response by industry group. The responses outlined in Tables B.4 to B.6 indicate that a representative sample was obtained for each industry group.

B.3 Survey Results

The computerized database of responses was used to determine employment aggregates for each industry group. Weighted averages were calculated for the proportion of part time and seasonal employment. Simple averages were calculated for the oil and gas price expectations. All percentage breakdowns of capital expenditures and of revenue (e.g., by region and type) were weighted by each firm's capital expenditures or revenue. All totals and averages excluded firms that did not or could not respond to that particular question.

It should be noted that the figures provided for 1987 are not as reliable as the data for earlier years due to a number of firms which could not provide 1987 estimates. The number of firms which did not respond to a particular question is identified in Appendix C with a summary of the aggregated survey responses for each industry group.

B.4 Survey Expansion Procedures

Special coding allowed identification of firms which did not provide an answer for a particular question. In each case where this occurred, other answers given by the non-respondents were examined to derive an appropriate response. If the group of non-respondents was "average" in the sense of forming a representative sample of the larger sample group, the sample average was assigned to each non-respondent for that particular question. If the group was not "average," answers were generally derived using previous years' data for these firms and the rate of change over time reported by the sample. This provided total sample results to which expansion factors were applied to estimate total industry results.

TABLE B.3

TELEPHONE INTERVIEW RESPONSE SUMMARY

	Operators	Service and Supply	Manufacturers	Total
Initial Population	326	300	260	886
Less: Deletions	37	33	19	89
Out of Business	1	9	5	15
Transfers[a]	-	(35)	35	-
Target Population	288	293	201	782
Refusals[b]	10	12	8	30
Not Contacted	1	2	2	5
Completed	277	279	191	747
Completed/Target Population (%)	96.2	95.2	95.0	95.5

[a]Companies initially listed as manufacturers that were actually service or supply contractors, or vice versa.

[b]Includes one manufacturer and three service and supply contractors whose responses were sent in the mail but not received in time to be included in the database.

TABLE B.4

OPERATOR RESPONSE RATE BY CATEGORY

Operator Category	Respondents		Total		Respondents/Total (%)
	(No.)	(%)	(No.)	(%)	
Integrated Producers	7	2.5	7	2.4	100.0
Senior Producers	23	8.3	24	8.3	95.8
Intermediate Producers	41	14.8	43	14.9	95.3
Junior Producers	206	74.4	214	74.3	96.3
Total	277	100.0	288	100.0	96.2

TABLE B.5

SERVICES PROVIDED BY SERVICE AND SUPPLY CONTRACTOR RESPONDENTS[a]

Service	Total Services[b]		Major Services[c]	
	Number of Firms	Percent of Firms	Number of Firms	Percent of Firms
Aerial photography and mapping	7	2.5	4	1.4
Geophysical contract	41	14.7	40	14.3
Drilling Rig contract	45	16.1	42	15.1
Service Rig contract	30	10.8	29	10.4
Supply Stores	16	5.7	13	4.7
Other Drilling and Oilfield				
Logging	18	6.5	6	2.2
Testing	22	7.9	14	5.0
Coring	5	1.8	1	0.4
Well Stimulation	9	3.2	4	1.4
Cementing	7	2.5	4	1.4
Trucking	6	2.2	1	0.4
Oilfield Construction	10	3.6	5	1.8
Mud	13	4.7	10	3.6
Other	139	49.8	106	38.0
TOTAL	NA	NA	279	100.0

[a]Services currently provided.

[b]In the telephone survey, each of the 279 firms indicated as many services as were applicable. Therefore, the totals of the number and percentages of firms are not applicable. A total of 65 firms indicated that they provide more than one service.

[c]The main service provided by each firm was determined subsequent to the survey based on additional analysis.

TABLE B.6

MAJOR TYPE OF MANUFACTURING OF
MANUFACTURER RESPONDENTS[a]
(number of firms)

Type of Manufacturing	Firms by Type of Mfg.		Firms by Type of Equipment		
	Number of Firms[b]	Percent of Firms	Exploration or Predrill	Drilling, Completion or Well Service	Production
Metal Fabricating	128	67.0	10	73	74
Machinery	35	18.3	5	17	22
Transportation Equipment	3	1.6	1	1	2
Electronics	11	5.8	3	3	8
Other	14	7.3	2	7	7
Total	191	100.0	21	101	113
Total (%)	100.0	NA	11.0	52.9	59.2

[a]Each of the 191 manufacturers indicated the one type of manufacturing from which they obtained most of their 1985 revenue.

[b]The totals do not add across for the types of manufacturing as each firm indicated as many types of equipment as were applicable.

A ratio estimation procedure was used to expand the total sample results to the total industry. For each expansion, it is assumed that the activity measure (e.g., capital expenditures) used to expand the total sample results and firm activity are proportionately related across all firms within a particular industry group (e.g., operators). Different expansion factors were developed for each industry group as outlined below.

B.4.1 Operators

The operator survey respondents represent most of the industry, accounting for about 90 percent of industry 1984 capital expenditures, employment, and natural gas sales (see Table B.7). Capital expenditures were used to extrapolate to the total industry as they are a comprehensive indicator of the industry's level of activity.

The Petroleum Monitoring Agency (PMA) reports capital expenditures by the 115 largest oil and gas operators.[1] Total industry capital expenditures are reported by Statistics Canada,[2] the difference between the two being comparable to the capital expenditures of junior operators as defined in this study. The 1984 capital expenditures for these groups are as follows:

Operator Group	1984 Capital Expenditures		Total/ Survey
	Survey ($millions)	Total ($millions)	
Major Operators	6,939.5	7,720.0	1.11
Junior Operators	865.6	1,013.6	1.17
Total	7,805.0	8,733.6	NA

[1]Petroleum Monitoring Agency Canada, Canadian Petroleum Industry 1984 Monitoring Survey (Ottawa: Minister of Supply and Services Canada, 1985), Schedule 4.

[2]Statistics Canada, The Crude Petroleum and Natural Gas Industry, Catalogue No. 26-213, Annual (Ottawa: Minister of Supply and Services Canada, 1985), Table 3.

TABLE B.7

COMPARISON OF OPERATOR RESPONDENTS DATA
TO TOTAL INDUSTRY DATA
1984

Item	Respondents	Industry[a]	Respondents/ Industry (%)
Capital Expenditures[b] ($millions)	7,805.0	8,733.6	89.4
Land Expenditures ($millions)	822.1	1,048.6	78.4
Geological and Geophysical Expenditures ($millions)	603.1	756.5	79.7
Employment	35,201[c]	36,580	96.2
Natural Gas Sales (10^3m^3)	61,683.2	70,985.3[d]	86.9

[a]Source: Statistics Canada, The Crude Petroleum and Natural Gas Industry, Catalogue No. 26-213, Annual (Ottawa: Minister of Supply and Services Canada, 1985).

[b]Includes oil sands expenditures.

[c]Part-time, contract, and seasonal employees excluded according to the percentage of these employees specified for 1985.

[d]Natural gas shipments.

The expansion factors for each industry group are, therefore, the ratio of the total industry figure to the sample result. Thus, an expansion factor of 1.11 was applied to the total sample results of the integrated, senior, and intermediate operators while a factor of 1.17 was applied to those of the junior operators.[3]

It is noteworthy that the estimate of 1985 capital expenditures using these factors is $10,719 million, within one percent of the actual total of $10,602 million.

B.4.2 Service and Supply Contractors

Both employment and revenue data were analyzed to develop a factor to expand the total sample results for the service and supply contractors to estimate the total industry. Total 1985 employment for this industry group was derived from figures provided by three major associations which represent most firms in the industry; the Canadian Association of Geophysical Contractors (CAGC), the Canadian Association of Oilwell Drilling Contractors (CAODC), and the Petroleum Services Association of Canada (PSAC).

The CAGC estimates that an average total of 53 field workers and 5 office staff are employed for each active geophysical crew. Based on an average of 65 active crews in 1985, this amounts to 3,770 geophysical contractor employees. In addition, according to a survey of their membership, each 10 geophysical contractor jobs result in an additional 6 jobs for survey crews and data processors. This results in total 1985 employment of 6,032 for the geophysical sector.

CAODC estimates that an average of 23 drilling and service rig workers are employed per active drilling rig. According to the CAODC, an average of 360 rigs were drilling, moving, or rigging in Western Canada in 1985, virtually all of which were Alberta based. Clerical staff amount to some 20 percent of the employment required for the total rig fleet of 533. This yields a 1985 employment estimate of 10,732 for the drilling and service rig contractors.

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[3]The expansion factors were applied to total survey results after accounting for firms that did not provide an answer to any given question.

PSAC estimates total 1985 employment for their sector at 30,000 based on a survey of their membership taken in the fall of 1985, some 85 percent of which would be in Alberta. Manufacturer Alberta employment of 9,673 for 1985 approximates employment for the Canadian Oilfield Manufacturers Association (COMA), which is associated with PSAC. This results in a total of some 15,827 service and supply industry employees.

These calculations result in an estimate of 32,591 persons employed by oil and gas field service and supply contractors in 1985 for their Alberta based operations. Given average 1985 employment of 20,469 by survey respondents, this results in an expansion factor of 1.59. Similar results are obtained using revenue data as follows.

Total Canadian geophysical contractor revenue amounted to $523 million in 1985.[4] Survey respondents for this sector indicated that 77 percent of their revenue was derived from activity in Alberta, yielding an estimate of $403 million in Alberta revenue. Drilling and service rig contractor fees amount to about 30 percent of total drilling costs in Alberta.[5] Given total 1985 drilling expenditures of $2,664.4 million in Alberta in 1985,[6] this results in total estimated 1985 Alberta drilling and service rig contractor revenue of $799 million. PSAC estimates total 1985 revenue for their sector and manufacturing at $3 billion. According to the survey results, some 76 percent of this was from service activity in Alberta. Subtracting estimated 1985 manufacturer revenue of $1,152 million yields revenue of $1,128 million for this sector. These figures result in total industry revenue of $2,330 million in 1985 from service activity in Alberta. This is 1.30 times survey results of $1,787 million.

Neither of the two factors calculated above are precise, if only because several major industry sectors such as oilfield trucking contractors (including rig movers) and oilfield construction contractors (except for geological work) have been excluded from both the analyses and the surveys. Thus, the total survey results of the service and supply contractors were expanded by a factor of 1.50 as a conservative estimate of the total industry.

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[4]"The Leading Edge," August 1986.
[5]"PSAC Well Cost Study," July 1985.
[6]Canadian Petroleum Association News Release, 1986 07 31.

B.4.3 Manufacturers

As previously indicated, the target population of manufacturers was deemed to be a comprehensive list of the entire industry. Therefore, the sample results were expanded to account for only the 10 manufacturers who either refused to answer or were not contacted. Employment data were used to derive the expansion factor as employment is indicative of the general level of manufacturer activity.

Employment figures for these 10 manufacturers were obtained from two sources; the Alberta Manufacturers Index and the Canadian Oil Register.[7] Since the Manufacturers Index provided an employment range and the figures of the two publications often differed, the figures of both were compared to derive a single estimate of employment for each firm. The estimated total of 626 employees was added to the 1984 total average sample employment of 7,613. The expansion factor was then calculated as 8,239/7,613, or 1.08.

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[7]Alberta Economic Development, Alberta Manufacturers Index (Canada: Alberta Economic Development, 1984); and C. O. Nickle Publications, Canadian Oil Register, 1985-86 Edition (Canada: C. O. Nickle Publications, 1985).

APPENDIX C

SURVEY RESULTS

OPERATOR CAPITAL EXPENDITURES
REPORTING FACILITY

Report for : (TOTAL REPORT - NO FILTERS)

Tuesday August 12 , 1986

QUESTION [0]

Number of questionnaires: 277

QUESTION [0(a)]

Enter category number: (1-4)

	COUNT
[1].	7
[2].	23
[3].	41
[4].	206

QUESTION [1(a)]

How many full-time, part-time, and contract people did your company employ/does your company expect to employ as of:

TOTALS	1984	1985	1986	1987
June 30	37326	48301	43295	28408
December 31	36847	47398	36212	28051

AVERAGES	1984	1985	1986	1987
June 30	145	153	165	128
December 31	142	179	151	127

NUMBER OF BLANKS	1984	1985	1986	1987
June 30	2	1	0	32
December 31	2	0	15	32

QUESTION [1(b)]

What percentage of your total employees were part-time, seasonal, or contract employees in 1985 and 1986?

WEIGHTED AVERAGE:

1985 9.23 %

1986 6.97 %

QUESTION [1(c)]

What percentage of your total employees were employed for your Alberta based operations in 1985 and 1986?

WEIGHTED AVERAGE:

1985 86.85 %

1986 87.86 %

QUESTION [2]

Could you please specify the number of employees in each of the following job categories for these three periods?

TOTALS	Dec. 1985	June 1986	Dec. 1986
Managerial & Administration	6803	6401	5365
Professional & Technical	14196	13185	10841
Sales, Clerical, & Related	10466	9814	7882
Oil & Gas Field Workers	13550	12386	10772
Manufacturing, Assembling, & Repairs	158	158	146
Construction Trades	8	6	6
Other	1847	1345	1126
Total	47028	43295	36138

AVERAGES	Dec. 1985	June 1986	Dec. 1986
Managerial & Administration	25	23	21
Professional & Technical	52	48	42
Sales, Clerical, & Related	38	35	30
Oil & Gas Field Workers	49	45	41
Manufacturing, Assembling, & Repairs	1	1	1
Construction Trades	0	0	0
Other	7	5	4
Total	171	156	138

PERCENTS	Dec. 1985	June 1986	Dec. 1986
Managerial & Administration	14.47	14.78	14.85
Professional & Technical	30.19	30.45	30.00
Sales, Clerical, & Related	22.25	22.67	21.81
Oil & Gas Field Workers	28.81	28.61	29.81
Manufacturing, Assembling, & Repairs	0.34	0.36	0.40
Construction Trades	0.02	0.01	0.02
Other	3.93	3.11	3.12
Total	100.00	100.00	100.00

NUMBER OF BLANKS	Dec. 1985	June 1986	Dec. 1986
Managerial & Administration	2	0	16
Professional & Technical	2	0	16
Sales, Clerical, & Related	2	0	16
Oil & Gas Field Workers	2	0	16
Manufacturing, Assembling, & Repairs	2	0	16
Construction Trades	2	0	16
Other	2	0	16
Total	14	0	112

QUESTION [3(a)]

What were your company's actual/are your company's planned upstream capital expenditures in the following calendar years before deducting PIP grants?

	TOTAL
1984	$ 7757.992 millions
1985	$ 9577.011 millions
1986	$ 6479.283 millions
1987	$ 4532.763 millions

	AVERAGE
1984	$ 29.838 millions
1985	$ 35.340 millions
1986	$ 25.610 millions
1987	$ 27.980 millions

	NUMBER OF BLANKS
1984	6
1985	4
1986	5
1987	72

QUESTION [3(b) part one]

Do your total capital expenditures include any capitalized repair expenditures? Enter 1 or 2

COUNT: [1]. Yes [2]. No

5 272

QUESTION [3(b) part two]

Please specify the amount of the capitalized repair expenditures included in total capital expenditures.

	TOTAL
1984	$ 39.030 millions
1985	$ 5.055 millions
1986	$ 5.025 millions
1987	$ 5.000 millions

	AVERAGE
1984	$ 9.758 millions
1985	$ 1.685 millions
1986	$ 2.513 millions
1987	$ 5.000 millions

	NUMBER OF BLANKS
1984	1
1985	1
1986	1
1987	1

QUESTION [3(c)]

Could you please specify what percentage of the total upstream capital expenditures in each year were/will be spent in the following areas before deducting PIP grants :

	WEIGHTED AVERAGES			
Area	1984	1985	1986	1987
Alberta	58.92%	66.82%	70.85%	80.04%
B.C.	3.90%	4.57%	4.68%	5.59%
Saskatchewan	7.71%	8.36%	5.75%	5.75%
Manitoba	0.99%	0.79%	0.47%	0.22%
Northern Canada	12.31%	8.34%	8.73%	2.57%
East Coast Offshore	15.92%	10.94%	9.44%	5.08%
Ontario	0.25%	0.17%	0.09%	0.03%

	NUMBER OF BLANKS			
Area	1984	1985	1986	1987
Alberta	2	0	1	67
B.C.	2	0	1	67
Saskatchewan	2	0	1	67
Manitoba	2	0	1	67
Northern Canada	2	0	1	67
East Coast Offshore	2	0	1	67
Ontario	2	0	1	67

QUESTION [3(d)]

Could you now please specify how the total upstream capital expenditures in each calendar year before deducting PIP grants were/will be divided between exploration and development. Development includes development drilling, EOR, and production facilities.

WEIGHTED AVERAGES

Year	% on Exploration	% on Development
1984	55.61 %	44.11 %
1985	47.33 %	52.36 %
1986	43.81 %	55.94 %
1987	34.90 %	64.15 %

NUMBER OF BLANKS

Year	Exploration	Development
1984	3	3
1985	2	2
1986	3	3
1987	70	70

QUESTION [3(e)]

Could you please specify the amount of land expenditures and geological and geophysical expenditures your company spent/plans to spend in the following calendar years. Land expenditures include land acquisition, rental, and retention exenditures.

TOTAL

Year	Land Expenditures	Geological and Geophysical Expenditures
1984	$ 802.108 millions	$ 581.368 millions
1985	$ 1002.812 millions	$ 673.935 millions
1986	$ 424.356 millions	$ 454.072 millions
1987	$ 295.483 millions	$ 348.469 millions

AVERAGE

Year	Land Expenditures	Geological and Geophysical Expenditures
1984	$ 3.038 millions	$ 2.211 millions
1985	$ 3.742 millions	$ 2.524 millions
1986	$ 1.583 millions	$ 1.688 millions
1987	$ 1.492 millions	$ 1.751 millions

NUMBER OF BLANKS

Year	Land Expenditures	Geological and Geophysical Expenditures
1984	13	14
1985	9	10
1986	9	8
1987	79	78

QUESTION [4(a)]

What average price for crude oil are your company's plans based on? (Canadian dollars per barrel at Edmonton)

	AVERAGES	BLANKS
- during the remainder of 1986	$ 19.86 Cdn./bbl.	11
- in 1987	$ 22.02 Cdn./bbl.	39

QUESTION [4(b)]

What average price for natural gas are your company's plans based on? (Canadian dollars per thousand cubic feet at the Alberta border)

	AVERAGES	BLANKS
- during the remainder of 1986	$ 2.16 Cdn./Mcf.	28
- in 1987	$ 1.84 Cdn./Mcf.	50

QUESTION [5]

How much natural gas did your company sell/does your company expect to sell in the following calendar years (thousand cubic feet per year)? Total, not just Alberta, gas sales for own account.

	TOTAL
Year	Amount of Natural Gas Sales
1984	2158607083 Mcf/year
1985	2306075760 Mcf/year
1986	2336510164 Mcf/year
1987	2030738143 Mcf/year

	AVERAGE
Year	Amount of Natural Gas Sales
1984	9901867 Mcf/year
1985	10158924 Mcf/year
1986	10114763 Mcf/year
1987	10103175 Mcf/year

Year	NUMBER OF BLANKS
1984	7
1985	5
1986	3
1987	38

Year	NUMBER OF ZEROES
1984	52
1985	45
1986	43
1987	46

SERVICE AND SUPPLY CONTRACTORS
REPORTING FACILITY

Report for : (TOTAL REPORT - NO FILTERS WITH BLANKS)

Tuesday August 19 , 1986

QUESTION [0]

Number of questionnaires: 279

QUESTION [1(a)]

Does your company provide services to the oil and gas industry in Alberta? Enter 1 or 2

	[1]. Yes	[2]. No
COUNT :	279	0

QUESTION [1(a) part two]

What percent of your company's 1985 revenue resulted from providing services to the oil and gas industry?

AVERAGE : 94 %

QUESTION [1(b)]

Does your company manufacture oil or gas field equipment in Alberta? Enter 1 or 2

	[1]. Yes	[2]. No
COUNT :	37	242

QUESTION [1(b) part two]

What percent of your company's 1985 revenue resulted from your total manufacturing operations?

AVERAGE : 3 TOTAL % 20 % FOR MAN

QUESTION [2]
Please specify the main services currently provided by your company to the oil and gas industry. Enter 1 or 2

[1]. Applicable [2]. Not applicable

COUNT APPLICABLE

7	Aerial photography and mapping services
41	Geophysical contract services
45	Drilling rig contract services
30	Service rig contract services
16	Supply store services
	Other drilling and oilfield services:
18	- logging
22	- testing
5	- coring
9	- well stimulation
7	- cementing
6	- trucking
10	- oilfield construction
13	- mud
139	- other

QUESTION [3(a)]

What was your company's total revenue in calendar year 1984 and 1985?

	TOTAL
1984	$ 1688947.598 thousands
1985	$ 2105175.717 thousands

	AVERAGE
1984	$ 6597.452 thousands
1985	$ 8627.769 thousands

	NUMBER OF BLANKS
1984	20
1985	34

QUESTION [3(b)]

What percentage of your total calendar year 1984 and 1985 revenue was from service activity in Alberta?

	WEIGHTED AVERAGE	NUMBER OF BLANKS
1984	77.50 %	1
1985	75.86 %	1

QUESTION [3(c)]

What percentage of your total calendar year 1984 and 1985 revenue was from each of the following types of services?

	WEIGHTED AVERAGES	
	1984	1985
Aerial photography and mapping	0.14%	0.11%
Geophysical contract	10.51%	9.47%
Drilling rig	28.75%	27.53%
Service rig	7.07%	6.64%
Supply store	5.40%	5.80%
Other drilling and oilfield	40.70%	43.10%
Other	7.43%	7.35%

	THOUSAND DOLLARS - ALBERTA ONLY	
	1984	1985
Aerial photography and mapping	$ 2174.223	$ 2361.303
Geophysical contract	$ 138780.128	$ 153938.317
Drilling rig	$ 355925.025	$ 412397.087
Service rig	$ 100999.207	$ 116847.074
Supply store	$ 80362.760	$ 107175.518
Other drilling and oilfield	$ 559679.799	$ 716853.670
Other	$ 70994.797	$ 88180.281

	NUMBER OF BLANKS	
	1984	1985
Aerial photography and mapping	0	0
Geophysical contract	0	0
Drilling rig	0	0
Service rig	0	0
Supply store	0	0
Other drilling and oilfield	0	0
Other	0	0

QUESTION [4(a)]

Do you expect your company's total revenue to increase, decrease, or stay about the same in the following calendar years? Enter 1,2,3, or 4

COUNT:	[1]. Increase	[2]. Decrease	[3]. Same	[4]. No opinion
- 1986 over 1985:	8	250	17	4
- 1987 over 1986:	44	41	57	137

QUESTION [4(b)]

What percentage increase/decrease do you expect in calendar year:

	AVG (NET)	AVG (+)	AVG (-)	BLANKS	THOUSAND DOLLARS	
1986 over 1985	-42 %	13 %	46 %	14	1986$	1187533.937
1987 over 1986	-4 %	21 %	24 %	152	1987$	674454.257

QUESTION [5(a)]

Did your company export any oil or gas field services from your Alberta based operations to countries outside Canada in calendar year 1984 or 1985? Enter 1 or 2

COUNT:	[1]. Yes	[2]. No
	49	230

QUESTION [5(a) part two]

What was your company's revenue from exporting oil and gas field services from your Alberta based operations in calendar year 1984 and 1985?

	TOTAL	AVERAGE	BLANKS
1984	$ 30968.000 thousands	$ 720.186 thousands	3
1985	$ 43421.000 thousands	$ 1142.658 thousands	4

QUESTION [5(b)]

What percentage of your total calendar year 1984 and 1985 revenue from exporting oil and gas field services from your Alberta based operations was from each of the following types of services?

	WEIGHTED AVGS		NUMBER OF BLANKS	
	1984	1985	1984	1985
Aerial photography and mapping	0.23%	0.02%	0	0
Geophysical contract	31.85%	33.11%	0	0
Drilling rig	8.69%	9.18%	0	0
Service rig	2.42%	1.73%	0	0
Supply store	4.84%	2.30%	0	0
Other drilling and oilfield	51.97%	53.66%	0	0

QUESTION [5(c)]

Do you expect your company's revenue from exporting oil and gas field services from your Alberta based operations to increase, decrease, or stay about the same in the following calendar years? Enter 1,2,3, or 4

COUNT:	[1]. Increase	[2]. Decrease	[3]. Same	[4]. No opinion
- 1986 over 1985:	11	17	20	1
- 1987 over 1986:	11	1	26	11

QUESTION [5(d)]

What percentage increase/decrease do you expect in calendar year:

	AVG (NET)	AVG (+)	AVG (-)	BLANKS	THOUSAND DOLLARS	
1986 over 1985	-31 %	20 %	47 %	7	1986$	27115.650
1987 over 1986	9 %	54 %	50 %	14	1987$	17543.352

QUESTION [6]

Does your company plan to export oil or gas field services from your Alberta based operations in calendar year 1986 or 1987? Enter 1 or 2

COUNT:	[1]. Yes	[2]. No
	43	187

QUESTION [7(a)]

Does your company expect a change between now and the end of 1987 in the level of competition in your Canadian market from imports of oil and gas field services? Enter 1,2, or 3

COUNT:	[1]. Yes	[2]. No	[3]. No opinion
	48	211	20

QUESTION [7(b)]

Do you expect the level of competition to increase or decrease? Enter 1 or 2

COUNT:	[1]. Increase	[2]. Decrease
	37	11

QUESTION [7(c)]

What effect will this have on your company's Alberta based operations? Enter 1,2,3 or 4

[1]. Significant effect [2]. Moderate effect
[3]. Small or no effect [4]. No opinion

	[1]	[2]	[3]	[4]
TOTAL COUNT:	17	19	12	0
INCREASE COUNT:	16	15	6	0
DECREASE COUNT:	1	4	6	0

QUESTION [8]

What average price does your company expect for crude oil during the remainder of 1986 and in 1987 (U.S. dollars per barrel).

	AVERAGES	BLANKS
- during the remainder of 1986	$ 15.58 U.S./bbl.	70
- in 1987	$ 17.87 U.S./bbl.	100

QUESTION [9(a)]

How many full-time and part-time people did your company employ/does your company expect to employ for your Alberta based operations as of:

TOTALS	1984	1985	1986	1987
June 30	15789	18315	11208	7009
December 31	19554	22623	10939	8562

AVERAGES	1984	1985	1986	1987
June 30	58	66	40	47
December 31	71	81	44	59

NUMBER OF BLANKS	1984	1985	1986	1987
June 30	2	0	0	119
December 31	1	0	21	122

QUESTION [9(b)]

What percentage of your employees for your Alberta based operations were part-time or seasonal employees in

WEIGHTED AVERAGE:

1985 36.02 %

1986 30.35 %

QUESTION [10]

Could you please specify the number of employees in each of the following job categories for these three periods?

TOTALS	Dec. 1985	June 1986	Dec. 1986
Managerial & Administration	1370	1204	1054
Professional & Technical	2756	2041	1491
Sales, Clerical, & Related	2040	1569	1391
Oil & Gas Field Workers	14569	4938	5980
Manufacturing, Assembling, & Repairs	1101	818	445
Construction Trades	142	142	142
Other	145	127	136
Total	22123	10833	10639

AVERAGES	Dec. 1985	June 1986	Dec. 1986
Managerial & Administration	5	4	4
Professional & Technical	10	7	6
Sales, Clerical, & Related	7	6	5
Oil & Gas Field Workers	52	18	23
Manufacturing, Assembling, & Repairs	4	3	2
Construction Trades	1	1	1
Other	1	0	1
Total	80	39	41

PERCENTS	Dec. 1985	June 1986	Dec. 1986
Managerial & Administration	6.19	11.11	9.91
Professional & Technical	12.46	18.84	14.01
Sales, Clerical, & Related	9.22	14.48	13.07
Oil & Gas Field Workers	65.85	45.58	56.21
Manufacturing, Assembling, & Repairs	4.98	7.50	4.18
Construction Trades	0.64	1.31	1.33
Other	0.66	1.17	1.28
Total	100.00	100.00	100.00

NUMBER OF BLANKS	Dec. 1985	June 1986	Dec. 1986
Managerial & Administration	1	1	22
Professional & Technical	1	1	22
Sales, Clerical, & Related	1	1	22
Oil & Gas Field Workers	1	1	22
Manufacturing, Assembling, & Repairs	1	1	22
Construction Trades	1	1	22
Other	1	1	22
Total	7	7	154

(Based on a sample of 275)

FIELD EQUIPMENT MANUFACTURERS
REPORTING FACILITY

Report for : (ALL MANUFACTURING TYPES) (ALL MANUFACTURED EQUIPMENT)

Tuesday August 12 , 1986

QUESTION [0]

Number of questionnaires: 191

QUESTION [1(a)]

Does your company provide services to the oil and gas industry in Alberta? Enter 1 or 2

	[1]. Yes	[2]. No
COUNT :	52	139

QUESTION [1(a) part two]

What percent of your company's 1985 revenue resulted from providing services to the oil and gas industry?

AVERAGE : 7 TOTAL % 25 % FOR SER.

QUESTION [1(b)]

Does your company manufacture oil or gas field equipment in Alberta? Enter 1 or 2

	[1]. Yes	[2]. No
COUNT :	191	0

QUESTION [1(b) part two]

What percent of your company's 1985 revenue resulted from your total manufacturing operations?

AVERAGE : 88 %

QUESTION [2(a)]

What type of manufacturing did the majority of your 1985 revenue come from? Enter 1,2,3,4, or 5

COUNT	
128	[1]. Metal fabricating
35	[2]. Machinery
3	[3]. Transportation Equipment
11	[4]. Electronics
14	[5]. Other

QUESTION [2(b)]

Does your company manufacture:
Enter 1 or 2

COUNT	
21	Exploration or Predrill Equipment?
101	Drilling, Completion, or Well Service Equipment?
113	Production Equipment?

QUESTION [3(a)]

What was your company's total revenue in calendar year 1984 and 1985?

	TOTAL
1984	$ 1316609.072 thousands
1985	$ 1419170.729 thousands

	AVERAGE
1984	$ 7234.000 thousands
1985	$ 8110.000 thousands

	NUMBER OF BLANKS
1984	8
1985	16

QUESTION [3(b)]

What percentage of your total calendar year 1984 and 1985 revenue was from your Alberta based operations?

	WEIGHTED AVERAGE	NUMBER OF BLANKS
1984	66.85 %	2
1985	68.85 %	2

QUESTION [3(c)]

What percentage of your total calendar year 1984 and 1985 revenue from your Alberta based operations was from each of the following types of equipment?

	WEIGHTED AVERAGES	
	1984	1985
Exploration and Predrill Equipment	1.17%	1.05%
Drilling, Completion, and Well Service Equipment	18.53%	20.29%
Production Equipment	44.81%	46.23%
Other	33.36%	32.42%

	THOUSAND DOLLARS	
	1984	1985
Exploration and Predrill Equipment	$ 13670.614	$ 14025.440
Drilling, Completion, and Well Service Equipment	$ 200685.669	$ 236047.891
Production Equipment	$ 429145.432	$ 492028.984
Other	$ 215963.891	$ 232968.429

	NUMBER OF BLANKS	
	1984	1985
Exploration and Predrill Equipment	0	0
Drilling, Completion, and Well Service Equipment	1	1
Production Equipment	1	1
Other	0	0

QUESTION [4(a)]

Do you expect your company's revenue from your Alberta based operations to increase, decrease, or stay about the same in the following calendar years? Enter 1,2,3, or 4

COUNT:	[1]. Increase	[2]. Decrease	[3]. Same	[4]. No opinion
- 1986 over 1985:	24	147	19	1
- 1987 over 1986:	50	14	49	78

QUESTION [4(b)]

What percentage increase/decrease do you expect in calendar year:

	AVG (NET)	AVG (+)	AVG (-)	BLANKS	THOUSAND DOLLARS	
1986 over 1985	-34 %	30 %	43 %	13	19960	882552.214
1987 over 1986	5 %	19 %	26 %	83	19870	760087.640

QUESTION [5(a)]

Did your company export any oil or gas field equipment from your Alberta based operations to countries outside Canada in calendar year 1984 or 1985? Enter 1 or 2

COUNT:	[1]. Yes	[2]. No
	81	110

QUESTION [5(a) part two]

What was your company's revenue from exporting oil or gas field equipment from your Alberta based operations in calendar year 1984 and 1985?

	TOTAL	AVERAGE	BLANKS
1984	$ 81202.000 thousands	$ 1144.000 thousands	3
1985	$ 115853.500 thousands	$ 1704.000 thousands	3

QUESTION [5(b)]

What percentage of your total calendar year 1984 and 1985 revenue from exporting oil or gas field equipment from your Alberta based operations was from each of the following types of equipment?

	WEIGHTED AVGS		NUMBER OF BLANKS	
	1984	1985	1984	1985
Exploration and Predrill Equipment	5.41%	4.05%	0	0
Drilling, Completion, and Well Service Equipment	49.00%	59.26%	1	1
Production Equipment	40.32%	31.04%	1	1
Other	2.80%	3.93%	0	0

QUESTION [5(c)]

Do you expect your company's revenue from exporting oil and gas field services from your Alberta based operations to increase, decrease, or stay about the same in the following calendar years? Enter 1,2,3, or 4

COUNT:	[1]. Increase	[2]. Decrease	[3]. Same	[4]. No opinion
- 1986 over 1985:	23	26	31	1
- 1987 over 1986:	22	4	33	22

QUESTION [5(d)]

What percentage increase/decrease do you expect in calendar year:

	AVG (NET)	AVG (+)	AVG (-)	BLANKS	THOUSAND DOLLARS	
1986 over 1985	11 %	64 %	12 %	8	1986$	112886.670
1987 over 1986	-3 %	42 %	36 %	26	1987$	96653.230

QUESTION [6]

Does your company plan to export oil or gas field equipment in calendar year 1986 or 1987 from your Alberta based operations? Enter 1 or 2

COUNT:	[1]. Yes	[2]. No
	32	78

QUESTION [7(a)]

Does your company expect a change between now and the end of 1987 in the level of competition in your Canadian market from imports of oil and gas field equipment? Enter 1,2, or 3

COUNT:	[1]. Yes	[2]. No	[3]. No opinion
	58	123	10

QUESTION [7(b)]

Do you expect the level of competition to increase or decrease? Enter 1 or 2

COUNT:	[1]. Increase	[2]. Decrease
	51	7

QUESTION [7(c)]

What effect will this have on your company's Alberta based operations? Enter 1,2,3 or 4

[1]. Significant effect [2]. Moderate effect
[3]. Small or no effect [4]. No opinion

	[1]	[2]	[3]	[4]
TOTAL COUNT:	23	22	12	1
INCREASE COUNT:	22	19	9	1
DECREASE COUNT:	1	3	3	0

QUESTION [8]

What average price does your company expect for crude oil during the remainder of 1986 and in 1987 (U.S. dollars per barrel).

	AVERAGES	BLANKS
- during the remainder of 1986	$ 16.14 U.S./bbl.	60
- in 1987	$ 18.82 U.S./bbl.	86

QUESTION [9(a)]

How many full-time and part-time people did your company employ/does your company expect to employ for your Alberta based operations as of:

TOTALS	1984	1985	198[illegible]	1987
June 30	7522	8822	6537	4620
December 31	7704	9030	5350	4770

AVERAGES	1984	1985	1986	1987
June 30	40	46	34	38
December 31	41	48	33	40

NUMBER OF BLANKS	1984	1985	1986	1987
June 30	0	0	0	56
December 31	0	0	16	59

QUESTION [9(b)]

What percentage of your employees for your Alberta based operations were part-time or seasonal employees in

WEIGHTED AVERAGE:

1985 5.21 %

1986 8.54 %

QUESTION [10]

Could you please specify the number of employees in each of the following job categories for these three periods?

TOTALS	Dec. 1985	June 1986	Dec. 1986
Managerial & Administration	686	663	556
Professional & Technical	796	767	595
Sales, Clerical, & Related	1087	988	838
Oil & Gas Field Workers	750	443	415
Manufacturing, Assembling, & Repairs	4952	3234	2581
Construction Trades	411	284	210
Other	63	28	29
Total	8745	6367	5224

AVERAGES	Dec. 1985	June 1986	Dec. 1986
Managerial & Administration	4	4	3
Professional & Technical	4	4	3
Sales, Clerical, & Related	6	5	5
Oil & Gas Field Workers	4	2	2
Manufacturing, Assembling, & Repairs	26	17	15
Construction Trades	2	2	1
Other	0	0	0
Total	47	34	30

PERCENTS	Dec. 1985	June 1986	Dec. 1986
Managerial & Administration	7.84	10.41	10.64
Professional & Technical	9.10	11.42	11.39
Sales, Clerical, & Related	12.43	15.52	16.04
Oil & Gas Field Workers	8.58	6.96	7.94
Manufacturing, Assembling, & Repairs	56.63	50.79	49.41
Construction Trades	4.70	4.46	4.02
Other	0.72	0.44	0.56
Total	100.00	100.00	100.00

NUMBER OF BLANKS	Dec. 1985	June 1986	Dec. 1986
Managerial & Administration	3	3	19
Professional & Technical	3	3	19
Sales, Clerical, & Related	3	3	19
Oil & Gas Field Workers	3	3	19
Manufacturing, Assembling, & Repairs	3	3	19
Construction Trades	3	3	19
Other	3	3	19
Total	21	21	133

APPENDIX D

INDUSTRY RESULTS

TABLE D.1

CRUDE OIL PRICE FORECASTS BY INDUSTRY GROUP[a]
1986-1987
($Cdn./barrel at Edmonton)

Industry Group	1986[b]			1987			Avg. Change 1987/1986 (%)
	Low	High	Average	Low	High	Average	
Operators	18.00	21.50	20.00	17.50	27.35	21.12	5.6
Integrated	13.64	25.35	19.45	16.00	27.00	21.08	8.4
Senior	15.00	25.36	20.09	15.50	28.99	22.16	10.3
Intermediate	12.00	38.00	19.86	15.00	36.00	22.12	11.4
Junior	12.00	38.00	19.86	15.00	36.00	22.02	10.9
Total							
Service and Supply Contractors	12.68	28.18	20.54	12.68	35.22	23.77	15.7
Manufacturers	12.68	33.81	21.33	12.68	40.85	25.11	17.7

[a]The service and supply contractors and manufacturers specified crude oil prices in U.S. dollars per barrel. The "typical" crude oil price is for West Texas Intermediate (WTI) at Chicago. To make the reported prices comparable to those of the operators, a conversion factor of 0.71 $U.S per $Cdn. was applied for both 1986 and 1987 and a transportation charge of $1.25 (Cdn.) per barrel and an import fee of $0.15 (Cdn.) per barrel were subtracted.

[b]The 1986 figures reported were averages for the remainder of the year (i.e., June to December).

TABLE D.2

OPERATOR NATURAL GAS PRICE FORECASTS (1986-1987)
AND NATURAL GAS SALES (1984-1987)

Operator Group	Natural Gas Prices[a] ($Cnd./Mcf)						Natural Gas Sales[b] (Bcf/year)			
	1986			1987						
	Low	High	Avg.	Low	High	Avg.	1984	1985	1986	1987
Integrated	1.84	2.87	2.34	1.25	2.20	1.82	455.2	467.0	467.5	486.7
Senior	1.90	2.95	2.39	1.25	2.50	1.99	1,250.6	1,349.1	1,333.7	1,340.2
Intermediate	1.50	2.95	2.29	1.50	2.55	1.89	409.2	431.9	448.2	484.9
Junior	1.20	3.00	2.09	1.20	3.00	1.81	319.3	348.3	369.5	380.6
Total[c]	1.20	3.00	2.16	1.20	3.00	1.84	2,434.3	2,596.3	2,618.9	2,692.4

[a]The 1986 figures reported were averages for the remainder of the year (i.e., June to December).
[b]Each operator reported total gas sales for own account.
[c]Total averages for price figures.

TABLE D.3

OPERATOR CAPITAL EXPENDITURES[a]
1984-1987
(million dollars)

Operator Group	Land				Geological and Geophysical				Total Capital Expenditures			
	1984	1985	1986	1987	1984	1985	1986	1987	1984	1985	1986	1987
Integrated	197.1	211.9	136.2	103.2	221.9	238.9	205.0	186.5	2,767.9	3,381.6	2,549.7	2,192.3
Senior	366.9	465.7	158.3	174.4	281.4	323.3	202.0	198.7	3,804.9	4,721.9	3,228.9	2,882.9
Intermediate	215.8	241.1	96.5	93.9	86.1	113.1	59.8	45.3	1,130.0	1,342.9	786.8	698.9
Junior	140.0	225.0	91.4	58.3	72.5	89.8	46.4	37.0	1,012.7	1,273.0	678.6	562.5
Total	919.8	1,143.7	482.4	429.8	661.9	765.1	513.2	467.5	8,715.5	10,719.4	7,244.0	6,336.6

[a]Land and geological and geophysical expenditures were specified separately to enable comparison of capital expenditures data with national accounts data.

TABLE D.4

REGIONAL DISTRIBUTION OF OPERATOR CAPITAL EXPENDITURES
1984-1987

Region	Percent[a]				Million Dollars			
	1984	1985	1986	1987	1984	1985	1986	1987
Alberta	58.92	66.82	70.85	80.62	5,135.2	7,162.7	5,132.4	5,108.6
British Columbia	3.90	4.57	4.68	5.63	339.9	489.9	339.0	356.8
Saskatchewan	7.71	8.36	5.75	5.79	672.0	896.1	416.5	366.9
Manitoba	0.99	0.79	0.47	0.22	86.3	84.7	34.0	13.9
Northern Canada	12.31	8.34	8.73	2.59	1,072.9	894.0	632.4	164.1
East Coast Offshore	15.92	10.94	9.44	5.12	1,387.5	1,172.7	683.8	324.4
Other	0.25	0.17	0.09	0.03	21.8	18.2	6.5	1.9
Total[b]	100.00	100.00	100.00	100.00	8,715.5	10,719.4	7,244.0	6,336.6

[a]Weighted average distributions for all respondents weighted by capital expenditures.
[b]Figures may not add due to rounding.

TABLE D.5

DISTRIBUTION OF OPERATOR CAPITAL EXPENDITURES BY TYPE[a]
1984-1987
(percent)

Operator Group	Exploration				Development[b]			
	1984	1985	1986	1987	1984	1985	1986	1987
Integrated	61	46	49	34	39	54	51	66
Senior	55	49	40	33	45	51	60	67
Intermediate	48	45	41	44	52	55	59	56
Junior	50	49	46	41	50	51	54	59
Total	56	47	44	35	44	53	56	65
Total ($millions)	4,881	5,038	3,187	2,218	3,835	5,681	4,057	4,119

[a]Weighted average distributions weighted by capital expenditures.
[b]Includes capital expenditures on production facilities.

TABLE D.6

DISTRIBUTION OF SERVICE AND SUPPLY CONTRACTOR SURVEY RESPONDENT REVENUE BY TYPE
1984-1985

TYPE OF SERVICE	TOTAL REVENUE				EXPORT REVENUE[a]			
	1984		1985		1984		1985	
	$Thousands	%	$Thousands	%	$Thousands	%	$Thousands	%
Aerial photography and mapping	2,686.3	0.14	2,598.2	0.11	72.2	0.23	8.9	0.02
Geophysical contract	201,669.3	10.51	223,678.6	9.47	9.994.8	31.85	14,660.7	33.11
Drilling rig contract	551,664.4	28.75	650,250.5	27.53	2,727.0	8.69	4,064.8	9.18
Service rig contract	135,661.5	7.07	156,834.9	6.64	759.4	2.42	766.0	1.73
Supply store	103,617.0	5.40	136,994.3	5.80	1,518.8	4.84	1,018.4	2.30
Other drilling and oilfield	780,964.9	40.70	1,018,009.4	43.10	16,308.5	51.97	23,760.0	53.66
Other	142,569.2	7.43	173,604.8	7.35	-	-	-	-
Total	1,918,832.6	100.00	2,361,970.7	100.00	31,380.7	100.00	44,278.8	100.00

[a]Based on 49 firms which indicated that they exported oil or gas field services in 1984 or 1985. Oil or gas field service exports from Alberta based operations only.

TABLE D.7

SERVICE AND SUPPLY CONTRACTOR SURVEY RESPONDENT
REVENUE EXPECTATIONS
1986-1987

	Total Revenue		Export Revenue[a]	
	1986	1987	1986	1987
Direction of Annual Change[b] (number of firms)				
Increase	8	44	11	11
Decrease	250	41	17	1
Same	17	57	20	26
No Opinion	4	137	1	11
Weighted Average Annual Change[c] (percent)				
Increase	13	87	20	90
Decrease	46	7	47	-
Revenue[d] ($thousands)	1,370,533.9	1,335,423.9	33,534.7	40,414.4

[a]Based on 49 firms which indicated that they exported oil or gas field services in 1984 or 1985. Oil or gas field service exports from Alberta based operations only.

[b]Direction of annual change from previous year.

[c]Weighted average annual change from previous year. These are based on the percentage change specified by each firm weighted by their revenue in the particular year.

[d]Revenue figures for 1986 and 1987 based on previous year figures.

TABLE D.8

EFFECT OF IMPORT COMPETITION ON SERVICE AND SUPPLY CONTRACTORS[a]

Type of Effect	Increased Competition		Decreased Competition		Total	
	No. of Firms	%	No. of Firms	%	No. of Firms	%
Significant effect	16	43.2	1	9.1	17	35.4
Moderate effect	15	40.5	4	36.4	19	39.6
Small to no effect	6	16.2	6	54.5	12	25.0
Total	37	100.0	11	100.0	48	100.0

[a]Based on 48 firms which indicated that they expect a change between now (June 1986) and the end of 1987 in the level of competition in their Canadian market from imports. Twenty firms did not express an opinion on this issue. The remaining 211 firms did not expect a change in this regard.

TABLE D.9

SERVICE AND SUPPLY CONTRACTOR INDUSTRY REVENUE
1984-1987
($thousands)

Year	Total Revenue	Total Revenue From Service Activity in Alberta[a]	Export Revenue[b]
1984	2,878,248.9	2,230,642.9	47,071.1
1985	3,542,956.1	2,687,686.5	66,418.2
1986	2,055,800.9	1,559,530.6	50,302.1
1987	2,003,135.9	1,519,578.9	60,621.6

[a]Total revenue from service activity in Alberta was calculated by multiplying total revenue by the percentage of revenue from service activity in Alberta specified by the respondents. The 1984 figure was 77.50 percent and the 1985 figure was 75.86 percent. The 1985 figure was used as a reasonable approximation for 1986 and 1987.

[b]Oil or gas field service exports from Alberta based operations only.

TABLE D.10

DISTRIBUTION OF OIL AND GAS FIELD EQUIPMENT MANUFACTURER REVENUE
FROM ALBERTA BASED OPERATIONS BY TYPE
1984-1985

Type of Equipment	Total Revenue[a]				Export Revenue[b]			
	1984		1985		1984		1985	
	$Thousands	%	$Thousands	%	$Thousands	%	$Thousands	%
Exploration or Predrill	11,260.6	1.17	12,093.4	1.05	4,784.7	5.41	5,089.2	4.05
Drilling, Completion, or Well Service	184,307.6	19.15	233,690.9	20.29	44,539.4	50.36	75,885.7	60.39
Production	445,803.1	46.32	532,571.0	46.24	36,641.5	41.43	39,746.1	31.63
Other	321,070.7	33.36	373,398.6	32.42	2,476.4	2.80	4,938.4	3.93
Total	962,442.0	100.00	1,151,753.9	100.00	88,442.0	100.00	125,659.4	100.00

[a]The manufacturers indicated that 66.85 percent of their total 1984 revenue and 68.85 percent of their total 1985 revenue came from their Alberta based operations.

[b]Based on 81 firms which indicated that they exported oil or gas field equipment in 1984 or 1985. Oil or gas field equipment exports from Alberta based operations only.

TABLE D.11

MANUFACTURER EXPECTATIONS FOR REVENUE FROM ALBERTA BASED OPERATIONS
1986-1987

	Total Revenue		Export Revenue[a]	
	1986	1987	1986	1987
Direction of Annual Change[b] (number of firms)				
Increase	24	50	23	22
Decrease	147	14	26	4
Same	19	49	31	33
No Opinion	1	78	1	22
Weighted Average Annual Change[c] (percent)				
Increase	30	19	64	42
Decrease	43	26	12	36
Revenue[d] ($thousands)	745,227.2	806,091.2	140,428.8	138,342.8

[a]Based on 81 firms which indicated that they exported oil or gas field equipment in 1984 or 1985. Oil or gas field equipment exports from Alberta based operations only.

[b]Direction of annual change from previous year.

[c]Weighted average annual change from previous year. These are based on the percentage change specified by each firm weighted by their revenue in the particular year.

[d]Revenue from Alberta based operations for 1986 and 1987 based on previous year figures. The 1985 percentage of revenue from Alberta based operations (68.85 percent) was assumed to apply to both 1986 and 1987 total revenue.

TABLE D.12

EFFECT OF IMPORT COMPETITION ON OIL AND GAS FIELD EQUIPMENT MANUFACTURERS[a]

Type of Effect	Increased Competition		Decreased Competition		Total	
	No. of Firms	%	No. of Firms	%	No. of Firms	%
Significant Effect	22	44.0	1	14.2	23	40.4
Moderate Effect	19	38.0	3	42.9	22	38.6
Small to No Effect	9	18.0	3	42.9	12	21.0
Total	50	100.0	7	100.0	57	100.0

[a]Based on 58 firms which indicated that they expect a change between now (June 1986) and the end of 1987 in the level of competition in their Canadian market from imports. Ten firms did not express an opinion on this issue. The remaining 123 firms did not expect a change in this regard. One firm expected an increase but could not specify the effect of the increase.

APPENDIX E

EMPLOYMENT RESULTS

TABLE E.1

OPERATOR EMPLOYMENT IN CANADA
1984-1987

Operator Category	1984		1985			1986			1987		
	June 30	Dec. 31	June 30	Dec. 31	Percent Change[a]	June 30	Dec. 31	Percent Change[a]	June 30	Dec. 31	Percent Change[a]
Integrated	13,155	13,720	14,968	14,886	8.5	13,631	12,367	(16.9)	11,936	11,663	(5.7)
Senior	29,033	27,370	29,552	29,374	7.3	27,110	26,104	(11.1)	26,270	25,972	(0.5)
Intermediate	4,225	4,310	4,713	4,824	11.9	4,295	4,118	(14.6)	4,099	4,117	(--)
Junior	3,329	3,354	3,639	3,718	10.9	3,186	2,865	(22.9)	2,884	2,870	(0.2)
Total	49,742	48,754	52,872	52,802	8.3	48,222	45,454	(13.9)	45,189	44,622	(1.8)

[a]Percent changes were calculated using the December 31 employment figures.

TABLE E.2

DISTRIBUTION OF EMPLOYEES BY CATEGORY[a]
1985-1986

Employment Category	December 1985		June 1986		December 1986	
	Number	%	Number	%	Number	%
Operators						
Managerial and Administration	7,640	14.47	7,127	14.78	6,750	14.85
Professional and Technical	15,936	30.18	14,688	30.46	13,636	30.00
Sales, Clerical, and Related	11,748	22.25	10,932	22.67	9,914	21.81
Oil and Gas Field Workers	15,212	28.81	13,796	28.61	13,545	29.80
Man., Assembling, and Repairs	180	0.34	174	0.36	182	0.40
Construction Trades	11	0.02	5	0.01	9	0.02
Other	2,075	3.93	1,500	3.11	1,418	3.12
Total	52,802	100.00	48,222	100.00	45,454	100.00
Service and Supply Contractor Respondents						
Managerial and Administration	1,400	6.19	1,245	11.11	1,234	9.91
Professional and Technical	2,819	12.46	2,111	18.84	1,744	14.01
Sales, Clerical, and Related	2,086	9.22	1,623	14.48	1,627	13.07
Oil and Gas Field Workers	14,897	65.85	5,110	45.59	7,000	56.22
Man., Assembling, and Repairs	1,127	4.98	841	7.50	521	4.18
Construction Trades	145	0.64	147	1.31	166	1.33
Other	149	0.66	131	1.17	159	1.28
Total	22,623	100.00	11,208	100.00	12,451	100.00
Manufacturers						
Managerial and Administration	770	7.84	735	10.41	644	10.64
Professional and Technical	893	9.10	806	11.42	689	11.39
Sales, Clerical, and Related	1,220	12.43	1,096	15.52	971	16.04
Oil and Gas Field Workers	842	8.58	491	6.96	481	7.94
Man., Assembling, and Repairs	5,559	56.63	3,586	50.79	2,991	49.41
Construction Trades	461	4.70	315	4.46	243	4.02
Other	71	0.72	31	0.44	34	0.56
Total	9,817	100.00	7,060	100.00	6,053	100.00

[a]Operator figures are for Canada whereas service and supply contractors and manufacturer figures are for their Alberta based operations only.

TABLE E.3

OPERATOR, SERVICE AND SUPPLY CONTRACTOR, AND MANUFACTURER
ALBERTA EMPLOYMENT[a]
1984-1987

Industry Group	1984		1985		1986		1987	
	June 30	Dec. 31	June 30	Dec. 31	June 30	Dec. 31	June 30	Dec. 31
Operators[b]								
Integrated	12,126	12,647	12,741	12,671	11,404	10,346	9,986	9,757
Senior	26,763	25,229	25,477	25,323	23,960	23,071	23,217	22,954
Intermediate	3,894	3,973	4,319	4,420	3,990	3,826	3,808	3,825
Junior	3,069	3,092	3,365	3,438	2,944	2,647	2,665	2,652
Total	45,852	44,941	45,902	45,852	42,298	39,890	39,676	39,188
Service and Supply Contractors								
Respondents	15,821	19,570	18,315	22,623	11,208	12,451	10,963	13,574
Industry	23,732	29,355	27,473	33,935	16,812	18,677	16,445	20,361
Manufacturers	8,124	8,320	9,528	9,817	7,060	6,053	7,011	7,319
TOTAL INDUSTRY	77,708	82,619	82,903	89,604	66,170	64,620	63,132	66,868

[a]Includes part time, seasonal, and contract employees.

[b]Operator Alberta employment was calculated from the respondents Canadian employment results by multiplying by the percentage of employment for their Alberta based operations. The 1984 figure of 92.18 percent was derived from Statistics Canada actual figures. The 1985 and 1986 figures were provided by the respondents. The 1986 figure was used as a reasonable approximation for 1987.

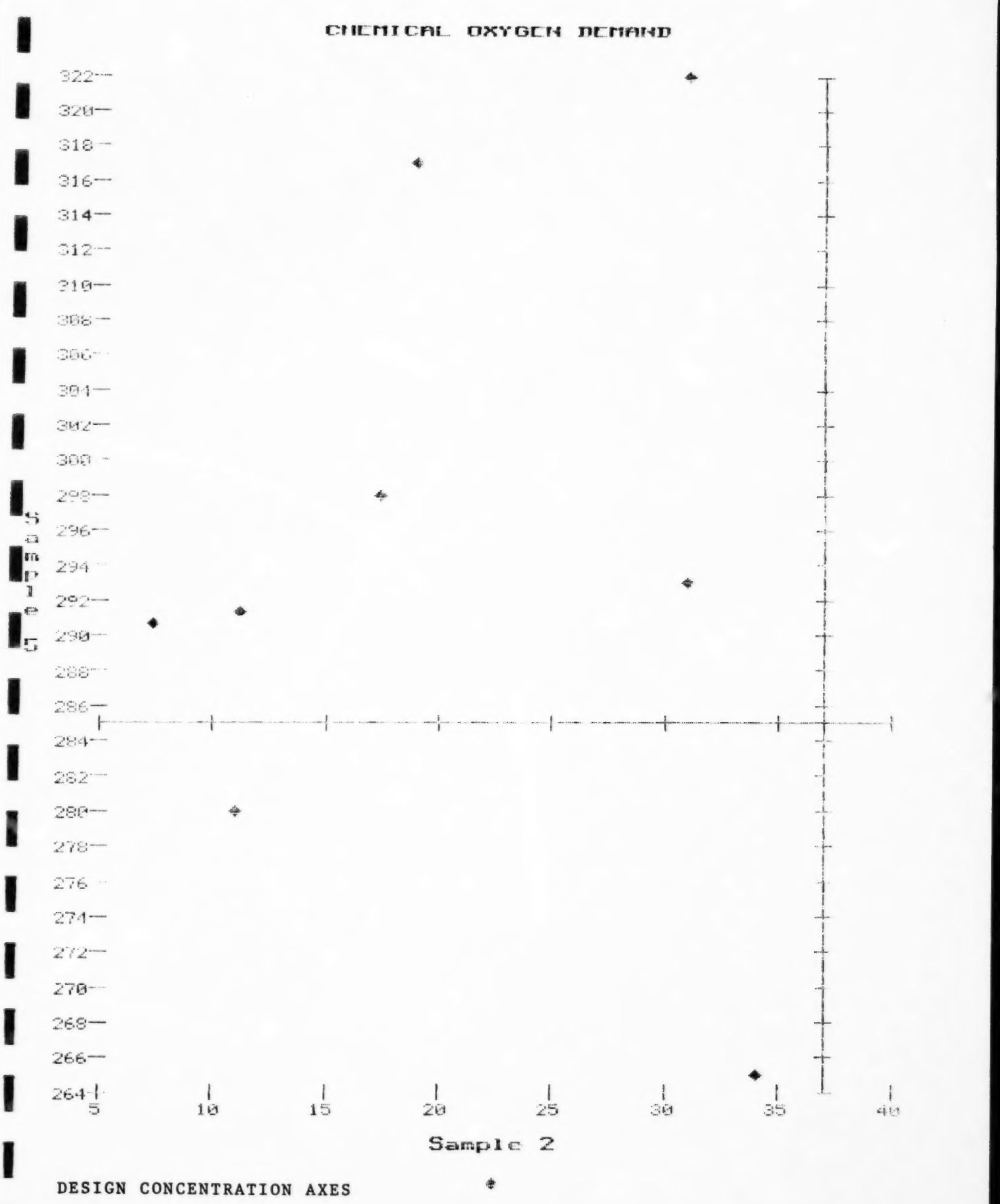
TABLE E.4

SERVICE AND SUPPLY CONTRACTOR EMPLOYMENT
VS. DRILLING RIG ACTIVITY
1984-1986

Year	Number of Drilling Rigs						Employment	
	Drilling	Rigging	Moving	Total Active	Total	Total % Active	Total Industry	Total Per Active Rig
1984								
January	232	4	31	267	389	68.6	NR	NA
February	245	4	29	278	379	73.4	NR	NA
March	231	2	23	256	378	67.7	NR	NA
April	92	-	8	100	389	25.7	NR	NA
May	93	1	24	118	386	30.6	NR	NA
June	157	1	34	192	385	49.9	23,732	124
July	184	2	27	213	376	56.6	NR	NA
August	196	2	18	216	373	57.9	NR	NA
September	157	-	28	185	378	48.9	NR	NA
October	201	1	28	230	390	59.0	NR	NA
November	240	2	32	274	400	68.5	NR	NA
December	274	3	27	304	402	75.6	29,355	97
Yearly Average	192	2	24	219	385	56.9	26,544	111
1985								
January	293	4	26	323	397	81.4	NR	NA
February	318	4	26	348	393	88.5	NR	NA
March	301	3	18	322	407	79.1	NR	NA
April	104	1	11	116	420	27.6	NR	NA
May	144	2	23	169	409	41.3	NR	NA
June	225	2	25	252	407	61.9	27,473	109
July	235	2	34	271	416	65.1	NR	NA
August	236	2	28	266	415	64.1	NR	NA
September	221	1	32	254	413	61.5	NR	NA
October	236	2	34	272	430	63.3	NR	NA
November	295	2	31	328	425	77.2	NR	NA
December	335	8	27	370	429	86.2	33,935	92
Yearly Average	245	4	26	274	413	66.4	30,704	101
1986								
January	379	4	26	409	439	93.2	NR	NA
February	374	6	33	413	443	93.2	NR	NA
March	305	3	20	328	456	71.9	NR	NA
April	48	-	1	49	461	10.6	NR	NA
May	31	1	4	36	466	7.7	NR	NA
June	51	-	11	70	469	15.4	16,812	240
Yearly Average[a]	198	2	16	218	456	48.7	16,812	240

SOURCE: (1) Personal communication with the Canadian Association of Oilwell Drilling Contractors, August 1986; and (2) Table E.3.

[a]Average for the first six months of 1986.



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